Volume I, No. 7 JULY, 1919 Old Series, Vol. XVII, No. 7

GENERAL LIBRARY
JUL -5 1919
UNIV. OF MICH.

The Journal of Orthopædic Surgery

The Official Publication of the
American Orthopedic Association
and of the
British Orthopædic Association

ISSUED MONTHLY
FOUR DOLLARS PER ANNUM

126 MASSACHUSETTS AVENUE
BOSTON, MASS., U.S.A.

For the
British Orthopædic Association

Editor
R. C. ELMSLIE, M.S., F.R.C.S.

Editorial Committee
T. R. ARMOUR, F.R.C.S.
W. H. TRETHOWAN, F.R.C.S.
H. PLATT, M.S., F.R.C.S.

For the
American Orthopedic Association

Editorial Committee
C. F. PAINTER, M.D.
ALBERT H. FREIBERG, M.D.
DAVID SILVER, M.D.

CONTENTS

PRESIDENT'S ADDRESS—READJUSTMENT TO CHANGING CONDITIONS.
By Herbert P. H. Galloway, M.D., C.M., F.A.C.S., Winnipeg, Canada.

A NOTE ON POTT'S DISEASE AND ALBEE'S SPINAL GRAFT.
By G. R. Girdlestone, F.R.C.S., Oxford, England.

INTERNAL DERANGEMENTS OF KNEE-JOINTS.
By Charles F. Painter, M.D., Boston.

THE STANDARDIZATION OF JOINT RECORDS.
By J. Appleton Nutter, M.D., Montreal, Canada.

CASE RECORDING IN SPINAL CURVES. By Edward H. Bradford, M.D., Boston.

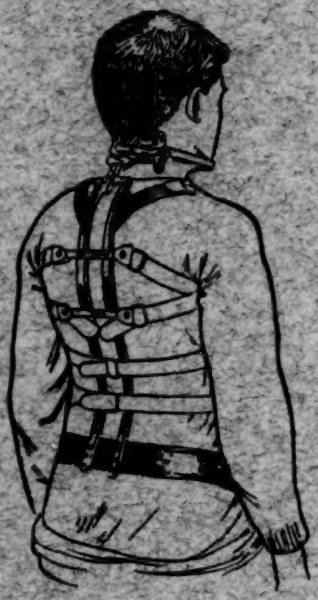
MESIAL TRI-PRISM. By William Jackson Merrill, A.B., M.D., Philadelphia.

A SIMPLE SPLINT FOR THE TREATMENT OF FRACTURES OF THE CLAVICLE. By Russell L. Hodge, Captain, M.C., Base Hospital 28.

ROBERT LINDER

Manufacturer of

Orthopedic Appliances



Hip Splints, Arm Splints, Knee Splints,
Bow-Leg Braces, Knock-Knee Braces,
Spine and Shoulder Braces,
and Flat-Foot Soles

ELASTIC STOCKINGS and TRUSSES
of every description

No. 148 East 53d Street, New York

The Journal of Orthopædic Surgery

The Official Publication of the American Orthopedic Association and of the British Orthopaedic Association.

For the British Orthopaedic Association

Editor,—R. C. ELMSLIE, M.S., F.R.C.S., 1a, Portland Place, London, W. 1.

Committee,—

T. R. ARMOUR, F.R.C.S.,
W. F. THETHOWAN, F.R.C.S.,
H. PLATT, M.S., F.R.C.S.

For the American Orthopedic Association

Committee,—

C. F. PAINTER, M.D.,
ALBERT H. FREIBERG, M.D.,
DAVID SILVER, M.D.

PUBLISHED ON THE FIFTH DAY OF EACH MONTH BY

ERNEST GREGORY, 126 MASSACHUSETTS AVE., BOSTON, MASS., U. S. A.

Entered as Second Class Matter in the Post Office at Boston, Massachusetts

Vol. I, No. 7 JULY, 1919 Old Series: Vol. xvii, No. 7

TABLE OF CONTENTS

PRESIDENT'S ADDRESS—READJUSTMENT TO CHANGING CONDITIONS. *By Herbert P. H. Galloway, M.D., C.M., F.A.C.S.*, Winnipeg, Canada. 395

A NOTE ON POTT'S DISEASE AND ALBEE'S SPINAL GRAFT. *By G. R. Girdlestone, F.R.C.S.*, Oxford, England. 401

DISCUSSION OF PAPER OF G. R. GIRDLESTONE. 411

INTERNAL DERANGEMENTS OF KNEE-JOINTS. *By Charles F. Painter, Lieut., J.G., U.S.N.R.F.*, Chelsea Naval Hospital. 416

THE STANDARDIZATION OF JOINT RECORDS. *By J. Appleton Nutter, M.D.*, Montreal, Canada. 423

CASE RECORDING IN SPINAL CURVES. *By Edward H. Bradford, M.D.*, Boston, Mass. 429

MESIAL TRI-PRISM. *By William Jackson Merrill, A.B., M.D.*, Philadelphia, Pa. 434

A SIMPLE SPLINT FOR THE TREATMENT OF FRACTURES OF THE CLAVICLE. *By Russell L. Hodge, Captain, M.C.*, Base Hospital 28, A. P. O. 753. 439

ORTHOPÆDIC SOCIETY MEETING. 442

BOOK REVIEWS. 443

CURRENT ORTHOPÆDIC LITERATURE. 446

ORIGINAL ARTICLES.—Papers for publication will be accepted only for exclusive publication in this Journal. Papers in foreign languages will be accepted and translated without charge, if suitable for publication. The American Orthopedic Association and the British Orthopædic Association do not officially endorse the opinions presented in the different papers published in this Journal.

Papers for publication and all other communications for the Editorial Department should be addressed in England to R. C. Elmslie, M.S., F.R.C.S., 1a, Portland Place, London, W. 1; in America to Miss Hannah Lissner, 372 Marlborough St., Boston, Mass.

CURRENT ORTHOPÆDIC LITERATURE.—Contributions for this department should be sent to Miss Hannah Lissner, 372 Marlborough St., Boston, Mass.

REFUSED MANUSCRIPTS will be returned provided stamps are forwarded for that purpose.

ADVERTISEMENTS.—Advertising forms go to press on the fifth of the month preceding the month of issue. Advertising rates will be furnished on application.

CHANGE OF ADDRESS.—When address is to be changed, both the old and new addresses should be given.

THE SUBSCRIPTION PRICE of this Journal is $4.00 per year, in advance, postage prepaid for the United States and Mexico; the equivalent of $4.50, or 18 shillings, for all foreign countries included in the postal union. Canada, $4.25. Single copies, 40 cents.

All communications concerning subscription and advertising should be addressed to the Publisher, and all checks, drafts and post-office orders should be made payable to

THE JOURNAL OF ORTHOPAEDIC SURGERY,
126 Massachusetts Avenue, Boston, Mass., U. S. A.

Athenia Corsets

for

Spinal and Abdominal Support

Made on natural lines to fit the average normal figure. Designed with the help and advice of eminent physicians to give support to the natural curve of the spine and abdomen without pressure at the waist or diaphragm.

As no corset will fit every figure, adjustments and alterations are often necessary and should be made under our supervision. For cases where this is impossible, we have prepared careful directions to insure proper fitting.

MANUFACTURED AND SOLD AT

Chandler's Corset Store

Established 1897

50 Temple Place **Boston**

The Management of an Infant's Diet

DIARRHEA OF INFANTS

Three recommendations are made—

Stop at once the giving of milk.

Thoroughly clean out the intestinal tract.

Give nourishment composed of food elements capable of being absorbed with minimum digestive effort.

A diet that meets the condition is prepared as follows:

Mellin's Food . . 4 level tablespoonfuls

Water (boiled, then cooled) **. 16 fluidounces**

Feed small amounts at frequent intervals.

It is further suggested:—As soon as the stools lessen in number and improve in character, gradually build up the diet by substituting one ounce of skimmed milk for one ounce of water until the amount of skimmed milk is equal to the quantity of milk usually given for the age of the infant; also that no milk fat be given until the baby has completely recovered.

MELLIN'S FOOD COMPANY, **BOSTON, MASS.**

Vol. I, No. 7 JULY, 1919 Old Series: Vol. xvii, No. 7

The Journal *of* Orthopædic Surgery

President's Address

READJUSTMENT TO CHANGING CONDITIONS.*

BY HERBERT P. H. GALLOWAY, M.D., C.M., F.A.C.S., WINNIPEG, CANADA.

Members of the American Orthopedic Association:

HAVING believed for many years that none of the honors open to a member of our profession are so worthy of being coveted as those which are within the gift of his own colleagues, I am deeply appreciative of your courtesy through which it becomes my privilege to occupy the President's chair at this thirty-third annual meeting of the American Orthopedic Association. Not only am I proud of the personal honor of having been elected to this office, but I am grateful for this evidence of your neighborly and fraternal sentiments toward the profession of the Canadian nation to which I belong.

This Association is meeting today under circumstances which cannot fail to arouse in us feelings of pleasure and gratitude, but which must at the same time deepen our sense of responsibility. The most frightful war in all history has happily terminated long before the most optimistic among us thought possible one short year ago; and with the lifting of that cloud of dread and uncertainty which rested upon civilized humanity for four dreadful years we once more realize how true it is that "there is a Divinity which shapes our ends, rough hew them how we will." Every page of the history of the universe reminds us

* Read at the Thirty-third Annual Meeting of the American Orthopedic Association, at Atlantic City, N. J., June 14 to 17, 1919.

of the fact that pain and sacrifice are the price of progress; and already there is abundant evidence that the terrible tragedies of this war, which so long drove humanity to the verge of despair, were merely the birth-pangs of a larger and better social and economic order, of a more rational conception of international life and right human relations.

Among the compensations which have grown out of the war the advance of surgical science is by no means least. While all departments of surgery have benefited, the war has done more to bring Orthopedic Surgery into its true inheritance than would have been accomplished by other agencies in many years; if indeed anything else would ever have brought about such complete emancipation of our specialty. Until somewhat recently the general surgeon was inclined to regard disparagingly, if not contemptuously, the orthopedic specialist, or, if more generous, to tolerate him in a good-natured and magnanimous kind of way. Now, however, it begins to look as though the general surgeon of the future may be compelled to explain how he became possessed of capacity and versatility so extraordinary as to enable him to be an all-round expert in a field which the great majority of surgeons find much too vast for thorough individual occupation.

But, while those of us who for years have fought for a reasonable degree of recognition now view proudly the pinnacle of deserved professional respect to which our specialty has been raised, it becomes us to recognize certain dangers and difficulties which lie ahead, the outlines of which are already so clearly drawn that it does not require the vision of a seer to recognize them. That process of readjustment of various human relations which is going on in many other spheres, and which we recognize as both desirable and necessary, must inevitably leave its impress to a greater or less degree on the future character and scope of that portion of the surgical field which we call ours. Our specialty is, to a certain extent, in a period of transition, and the difficulties and confusion which are more or less inseparable from all processes of readjustment to changing conditions cannot be wholly escaped. but we must never lose sight of the fact that the future complexion of orthopedic surgery will be determined largely by the completeness with which we of the present day recognize and shoulder the responsibilities which confront us.

What caused orthopedic surgery to separate from general surgery in the first instance? Was it not that the average general surgeon was lacking in his grasp of mechanical principles as applied to surgery, and that his patience and perseverance were unequal to the task of

solving by slow and laborious means the problems inseparable from the successful treatment of a considerable class of uninviting and neglected surgical cases? By combining surgical knowledge with the mechanical resourcefulness of the instrument maker, by becoming an expert in manipulative surgery and a wizard in the use of splints and plaster of Paris, the pioneer orthopedic surgeon managed with a minimum of operative skill to rescue from the ranks of the incurable multitudes the cases which at one time were regarded as practically hopeless. It was thus that orthopedic surgery established the first base from which its further invasion of the surgical field began. By the gradual addition to the ranks of the orthopedic specialists of surgeons having wider surgical training and experience than the pioneers, the boundaries of the specialty slowly widened, and, as was inevitable, conservatism was departed from, the younger orthopedic surgeons became increasingly aggressive and operative surgery came more and more, not merely to supplement, but often to supplant those slower mechanical processes which were characteristic of the earlier orthopedic régime. This natural evolutionary process has proceeded so far that the really representative orthopedic specialist of today is a surgeon whose training and experience enable him at will to attack any orthopedic problem with either the mechanical skill of a Taylor, a Thomas or a Sayre, or the finished operative technique of a Robert Jones. That is where the front line stands today, and where it must remain if orthopedic surgery is to continue to survive and prosper as a specialty.

But the war has had many unexpected results, among which was the discovery that certain classes of cases formerly regarded as belonging to the realm of general surgery were found to ally themselves so naturally with our specialty that many varieties of traumatism, which at one time no one regarded as orthopedic, are now generally accepted as belonging to our domain. The sudden enormous increase of orthopedic work created by the war, together with the expansion of the former boundaries of this specialty, created a demand for trained orthopedic surgeons which could not be met from the ranks of recognized specialists; consequently many young general surgeons have, during the war, enjoyed exceptional opportunities for acquiring a familiarity with military orthopedic surgery, and it is almost inevitable that not a few of these, enthralled by the intensely interesting work of physical reconstruction, will desire to be regarded as orthopedic specialists on their return to civil practice. In the situation which has arisen two dangers may be plainly discerned: The first is that some of those who are

recognized as orthopedic specialists, but who lack a really comprehensive general surgical training, may in future be tempted to accept cases which their general surgical knowledge has not fitted them to undertake, but which they may not have the courage to refuse when faced with the fact that both the profession and the public have come to regard these cases as belonging to the orthopedic field. Against this danger, which is by no means imaginary, about the only safeguard I can see is conscience and individual honesty. Nothing would more certainly bring our specialty into deserved contempt than such weakness on the part of those who practise it as would tempt them to venture beyond their depth. The justification of surgical specialties lies in the fact that devotion to a limited field should provide the patient with wider experience and greater skill than can be offered by general surgery; and the specialist who weakly permits himself to attempt cases which he is not better equipped to handle than the average general surgeon, not only violates justice and humanity, but brings discredit upon the specialty which he should aim to honor and adorn.

The second danger lies in the fact that military orthopedic surgery, comprehensive as it is, is by no means representative of civil orthopaedic surgery; and many a surgeon who could do the most difficult bone-grafting operation with consummate skill might find himself floundering discreditably in his attempt to treat cases of scoliosis, infantile club-foot, the disabilities resulting from infantile paralysis, and many of the tedious tubercular bone and joint conditions which demand the illimitable patience and mechanical resourcefulness of the older school of orthopedic surgeons.

It is the plain duty of those specialists who most truly embody in themselves the best elements of the orthopedic surgery of the past, together with its more modern developments, to guard against these dangers; and unless this Association be careful, not only to keep step with progress, but also to preserve the best of those traditions of our specialty which have come down to us from the times of Sayre, and Thomas, and Taylor, the line of demarcation between orthopedic and general surgery will in time become almost indistinguishable; then we will find history repeating itself—a new generation of orthopedists will arise who will revive the half-forgotten but indispensable mechanical aspect of this specialty.

The solution of some of the difficulties which lie ahead will almost certainly be found in the further development of the Orthopedic Section of the American Medical Association, and of local and inter-urban

orthopedic clubs. Both of these agencies have already proved their worth and will more and more contribute to the evolution of orthopedic surgeons of the highest type; and toward them the American Orthopedic Association should maintain a thoroughly sympathetic attitude. At the same time it must be frankly recognized that this Association will be unworthy, both in character and achievement, unless it become the embodiment of both the best traditions and the highest ideals of our specialty; and inasmuch as the character of the Association must be determined by the character of the individuals of which it is composed, it is imperative that the standard for future admission to membership be such as shall make the Association really representative of the modern conception of orthopedic surgery.

I have been slow to reach the conclusion that our standards for admission to membership must be raised, for my sympathies lie with those who seek opportunity to develop themselves. In the past, when conditions for admission have been debated in our executive sessions, I have stood in opposition to proposals which would make the attainment of membership more difficult, because I felt that one of the chief functions of the Association was to foster the development of those who were striving to perfect themselves in the work of our special field, and I had repeatedly seen very unpromising raw material develop incredibly within a few years in the favorable environment which this Association provides. But we must not be blind to the fact that conditions have changed to such an extent that the orthopedic surgeon of the future can neither adequately represent our specialty, nor meet creditably the demands which will be made upon him unless he be conscious of possessing wide general surgical training and experience. Consequently, for the sake of our members themselves, as well as for the welfare of the Association and of the public, it seems to me the time has arrived when no applications should be considered unless the candidate has been admitted to Fellowship in the American College of Surgeons, or one of the Royal Colleges of the Old Country. Both as individuals, and as an Association, we must not forget that, as in other spheres of human activity, what we achieve depends chiefly on what we demand of ourselves and our circumstances.

"I bargained with Life for a penny,
And Life would pay no more
However I begged at evening
When I counted my scanty store.

For Life is a just employer,
  She pays you what you ask,
But once you have set the wages,
  Why you must bear the task.

I worked for a menial's hire,
  Only to find, dismayed,
That any wage I had asked of Life,
  Life would have paid."

An event of outstanding importance during the past year, and one which means much to the future development of orthopedic surgery is the formation of the British Orthopædic Association, and it is a matter for sincere congratulation that our JOURNAL is now the official organ of both of these Associations, the true fraternity between which has been permanently cemented through elements of comradeship incidentally arising out of the war. The American Orthopedic Association extends most cordially the right hand of fellowship to this newly born organization, whose credentials are guaranteed by the fact that it is British. It was my expectation, until a few weeks ago, to welcome to this meeting the most distinguished member of the British Orthopædic Association, one whom we have all learned not only to admire, but to love, the Gamaliel of the orthopedic world, to whom all orthopedic surgeons make pilgrimage that they may sit at his feet and learn,—Major-General Sir Robert Jones. His services to the cause we represent can never be over-estimated, and with unfeigned respect the members of this Association look up to him as a Master. Our disappointment in not having him with us as we expected is tempered somewhat by the knowledge that it was his loyalty to duties growing out of the war which kept him at home.

It is impossible to look into the faces of this assemblage without being painfully reminded of the fact that two of our most respected members, who for many years have been regular attendants at these annual gatherings, and who were with us one year ago, will never more be seen in our midst.

"Death, a necessary end,
  Will come when it will come."

Our late treasurer, Dr. G. G. Davis, was most devoted to his work and died in harness. He will be greatly missed, but his genial manner and

kindly unostentatious character will long remain a grateful memory to those whose privilege it was to know him. At my request Dr. H. Augustus Wilson had consented to present to this meeting a brief obituary of Dr. Davis; but alas! he too has fallen by the wayside. His keen, thoughtful mind and sound judgment will be greatly missed in the counsels of this Association, but the knowledge of his busy, useful life and the memory of his merry smile and generous, kindly spirit will not soon depart from our midst. Both were good men and true: "Their works do follow them."

A NOTE ON POTT'S DISEASE AND ALBEE'S SPINAL GRAFT.*

BY G. R. GIRDLESTONE, F.R.C.S., CAPTAIN, R.A.M.C.T.,
Hon. Surgeon, Baschurch. In charge Orthopædic Centre, Oxford.

As the treatment of Pott's disease by Albee's operation is not yet widely practised, it is felt that some statement may be made of our experience at Baschurch, with reference to a list of 50 consecutive cases.

It is with the approval of Colonel Sir Robert Jones, to whom, with Miss Hunt, the superintendent, the credit of the work done at Baschurch is due, that this note is being written; and it deals with cases operated on by him, Captain Aitkin, Captain Dunn and myself.

The diagnosis is based on the usual symptoms, special stress being laid on the presence of muscular spasm resisting movement in all directions, and x-ray findings.

The following points will be dealt with:

1. The special advantages of the operation.
2. The choice of case.
3. The pre-operative treatment.
4. The preparations for, and the technique of, the operation.
5. The after-treatment.
6. Table of cases.

* A paper read before the British Orthopædic Association, July 26, 1918.

THE SPECIAL ADVANTAGE OF OPERATION.

The main idea of the operation is that of fixation of the affected vertebrae with those above and below by an autoplastic graft from the tibia, and is based upon the possibility of controlling all movements of a section of the vertebral column by immobilization of the spinous processes.

In every movement of the spinal column the relations of the lateral articulations, bodies, and spinous processes of the vertebrae are involved, and in all, the lateral articulations provide an axis of movement, or, if the spines are fixed, a fulcrum for resistance to movement. If, then, the spines can be absolutely fixed, and the lateral articulations are sound, no movement of the bodies can take place.

One of the main conditions predisposing to continuance and aggravation of the disease is movement of the diseased bones, especially when it involves gradual crushing of the bodies of the vertebrae.

The vertebral column is built up in such a way that there is no locking or automatic stability in any position, and the immobility of the joints depends entirely on muscular tone and balance.

While there is a strong and efficient muscular control of the spine behind in the erector group, there is no such specialized group in front —the balance is kept up by the musculature of the thorax and of the abdomen, with its varying tension and action. In the erect position and during locomotion, weight and the shifting centre of gravity also tend to upset the balance, but these are factors which can be eliminated during bed treatment. Their importance becomes very great, however, when the patient is allowed to get up. Then comes a severe test of the bony healing, which may bring increase of curvature, and recrudescence of the disease.

The value of Albee's operation is great in that it tends to give:

(1) Permanent immobility in the corrected position.

(2) A greatly reduced period of confinement to bed.

(3) A safeguard against recrudescence of disease.

THE CHOICE OF CASE.

In our opinion, the operation is of great benefit in *all cases* of unhealed tubercular disease of the vertebral bodies, where there are no contraindications. Especially is it of value in cases where recrudescence tends to occur after prolonged periods of treatment. As to contraindications we consider:

(1) *Age.* There are no definite limits, but at present we prefer not to operate before the age of three years. On the other end of the scale

the general condition or the activity of the disease, etc., may preclude operation.

(2) *Position.* Disease of the atlanto-occipital and atlanto-axial regions is not readily amenable to a graft operation.

(3) *State of Activity.* We prefer not to operate while the disease is in the more active phase. The cases are kept immobilized on frames until signs of activity abate.

(4) *Sepsis.* We look upon the presence of a discharging sinus, or any other septic focus, on or near the site of operation, as a definite contraindication.

(5) *The Question of "Cold Abscess."* An unopened psoas or lumbar abscess is not a contraindication, provided it is not necessary to operate *through* the abscess. We have not operated through such an abscess, but in cases reported from other sources abscesses have been opened at an operation, with harm resulting.

Unopened abscesses are left unless:

(*a*) They are enlarging and tending to point, when they are emptied by aspiration, or a small incision and suture, without lavage or any interference with the sac; or

(*b*) There are signs of secondary infection, *e.g.*, associated with high temperature, when the abscess is opened, washed out, and sutured, drainage being avoided whenever possible.

THE PRE-OPERATIVE TREATMENT.

Immediately upon detection of active Pott's disease treatment is begun. This consists in:

(1) *Splinting.* This generally consists in the use of double Thomas frame, but in special cases plaster of Paris is used. It is designed to give complete rest to the diseased parts.

(2) *Reduction of Deformity.* The method of reduction of deformity, where advisable, depends on the site of the lesion. We attempt to get rid of the "reducible" deformity by very gradual means.

(3) *General Treatment*, including good feeding, open air, warmth.

The cases are nursed in long huts, with a floor, one side, two ends and a roof; they are kept warm with sufficient blankets and hot water bottles.

For the description of the methods of splintage it is convenient to take the cases in regional groups, taking the largest group first.

(1) Mid dorsal, low dorsal, dorso lumbar, high lumbar.

(2) High dorsal, cervical.

(3) Low lumbar.

(4) Lumbo sacral.

FIRST GROUP. MID DORSAL, LOW DORSAL, DORSO LUMBAR, HIGH LUMBAR.

(*a*) *Immobilization.* These cases are treated entirely on the double Thomas' spinal frame. This is fitted accurately to each case. The saddle, which should be thick, moderately soft, and evenly padded, should lie from the first or second thoracic vertebra to the tip of the coccyx, and its legs should reach to the middle of the popliteal space. The saddle is loosely attached to the frame, so that it may be slid up and down for an inch or two. The main posterior bars of the frame must be made of ample strength and rigidity; the lateral bars should be strong enough to retain the position given them by the use of a wrench.

Where there is no marked kyphos, the patient is placed carefully and directly on the frame, the fold of the buttocks coinciding with the antero-posterior bend of the frame, and the saddle being adjusted as de-described above, so as to allow nursing facilities. Where a marked kyphos or any projection is present, it is fully protected with thick felt accurately cut; of this several layers may be necessary. The legs are wrapped warmly in cotton wool, and a straight gutter splint runs from the mid thigh to the mid leg, with a thick pad under the knee. Any danger of *genu retroversum* must be avoided. Except in cases of dropped foot or spasm we do not like puting right angle splints on the feet, as they prevent movement of the ankle, which is the only joint of the leg which the child can move with impunity. The body bars are bent round the abdomen and chest. The bend should commence fairly sharply, and as far back as possible, so as to lift up the sides of the saddle and thus provide some lateral support against movement. The neck straps are tied across the chest, after passing diagonally through the holes in the ends of the chest bars.

Fixation of the legs by extensions, with groin strap counter extension, is very rarely needed, and then only in the case of troublesome patients.

Turning. For the purpose of turning the patient without fear of movement, a plaster cast is made as follows:

An old blanket, or similar piece of material, is spread over the body from the chin downwards and is split to cover the front and sides of the thighs and legs. Plaster bandages are then run over this in all directions, until the plaster cuirass is complete. For adults it can be strengthened by incorporating light iron bars in the plaster in the hip region. The cuirass is now removed, and set aside for a day or two to dry.

When in use, the chest and neck are protected with wool, etc. The sides of the frame are bent outwards, so as to be below the level of the chest and abdomen; the bandages are taken off the legs, and the cuirass put in place. Straps are placed under the frame and round the cuirass in the region of the chest, abdomen, thighs and legs. When the turning team are quite ready these straps are pulled up tight, fixing the cuirass and frame together with the patient held firmly between them.

Of this team:

One is to stand at the head to manage the head and arms;

One to stand at the bottom, to take the cross bar of the frame and to see that when the patient is lowered the toes project over the end of mattress or table.

The others are to place their right hands under the nearer bar of the frame, and their left hands over the body and under the further bar. Then, at the word "lift," they all lift together, and at the word "turn," roll the whole frame over into their right arms; at the word "lower," lowering it onto the table or bed.

The straps are immediately loosened, and the frame lifted off the patient. The dressing of the wound can now be done at leisure and the splint cleansed and freshened.

The straps are not removed, and when all is ready, the frame, splints, etc., are reapplied, and the process reversed.

This is now almost the invariable method of turning these cases; it is invaluable in preventing any movement. After grafting, this control is especially helpful as one is not afraid to turn the patient as often as may be indicated, for dressing the wound and re-applying the special protective padding.

Apart from this formal turning, no movement whatever is allowed. The lower part of the frame is lifted by the bar for nursing purposes. As regards washing, the nurse washes only what she can see.

In all cervical and dorsal cases the frame has a head-piece, and it is important that the head should be allowed to rest right back on this, and not be propped up on pillows, so as to keep up the tendency to extension in opposition to flexion of the spine. At Baschurch the tedium of this position is much relieved by the use of a hand looking-glass fixed on the end of a stick as a periscope.

(*b*) *Reduction of Deformity.* The practice is to promote gradual correction by the influence of gravity; the frame is flat, the head-piece low, and the thickness of felt surrounding and protecting the kyphos is lessened every few days. In applying this felt the layer near-

est to the kyphos is cut crucially, so that the prominent angle is protected from the weight-bearing pressure; this is taken just on each side of the spine, and immediately above and below the kyphos. The next layer is cut similarly, but on a larger scale, and so on. The result is, that while there is a concentration of body weight in the region of the kyphos tending to reduce the deformity, yet there is protection for the skin over the angle. As the straightening occurs the number of layers is reduced.

By this treatment, what may be termed the reducible deformity is got rid of, but in many cases a certain fixed deformity remains.

SECOND GROUP. HIGH DORSAL AND CERVICAL.

(*a*) Splinting. In these cases, plaster is often found more effective in immobilization than the frame. The casing begins with a firm grip of the pelvis, and is carried up to include the head. An elastic cotton net vest is worn next the skin, and over that felt, with careful protection of the prominent region. This is applied in as much extension as can be obtained without force.

In other cases, a frame and head-piece, with the saddle carried up on the neck, coupled with a plastic cuirass, including the neck and sides of the head, is used. In making this cuirass, it is necesssary to insert temporary pads to protect the lines of the neck.

A second cuirass, firmly controlling the chin, and including the legs, is used for the formal turning.

The headpiece has the leather well hollowed, so that the head beds down comfortably into it. The head is then fixed to the headpiece with a collar made of strong paper and muslin round the forehead.

(*b*) *Reduction of Deformity.* This is accomplished, so far as possible, by a series of such plasters.

When the frame is used it is achieved by altering the lie of the headpiece slightly each time it is removed, after "turning."

THIRD GROUP. LOW LUMBAR.

Both for this group and the next, a frame is not so satisfactory as plaster, in that the pelvis is not controlled so completely. For this group the plaster jacket includes the trunk and one thigh.

FOURTH GROUP. LUMBO SACRAL.

Here it is necessary to include both thighs in the plaster. As there is usually lordosis, it is advisable to correct this as far as possible by

flexing the thighs on the trunk, and then to put on the plaster in the position of moderate flexion. Later, by controlling the pelvis and spine, the limbs can be extended.

(4) *The Operation.* This need not be described in detail. We attach importance to:

(*a*) The use of ether rather than chloroform.

(*b*) The warmth of the theatre and the table.

(*c*) The complete avoidance of hammering, except the few taps necessary for the conversion of the drill holes into transverse cuts in getting the graft from the tibia.

Lately I have preferred not to use a tourniquet for the leg. It is necessary to note carefully the length of the spinous processes, as over a kyphos they are often much shortened, and there is a real risk of opening and so possibly injuring the cord by cutting down too far. We take great care to prevent any movement of the spine during the operation as this might well lead to reactivity, a dissemination, of the disease.

POST-OPERATIVE COMPLICATIONS.

(1) *The Development of Pressure Sores.* This is almost always avoidable by accurate padding. If they occur the patient is turned every other day.

(2) *Protrusion of One End of Graft.* Possibly due to insufficient suturing. In one case this happened: the end was cut off and the wound resutured, with ultimately good results.

POST-OPERATIVE TREATMENT.

Immediate. During the first few hours, treatment for shock is indicated.

Later. Dressings. The first dressing is done 4, 7, or 10 days after the operation, the period depending on the presence or absence of such indications for early dressing, as discomfort, sharp bony prominences, or poor nutrition of the skin.

For the dressing, the employment of the cuirass is specially indicated, with, in the case of adults, a team of lifters drilled in its use. At each dressing, the arrangement of the protective padding round the graft areas should be done by the surgeon himself. It must be very thick, and so disposed that the weight is off the operation area, and on broad areas above, laterally, and below.

The patient is turned about once a week to refresh the protective padding, which flattens out amazingly.

Removal of Frame. In all cases of Group 1, where a strong graft can be placed firmly in position in strong spines, and where the angulation is not great, the frame is changed for a light spinal support (Jones') at the end of three months. The patient lies in bed in this for another month, and is given massage to restore muscular tone. He is then allowed to sit up in a chair, and soon to walk. He wears the support for a year.

In the other groups, light plaster jackets are used instead of the spinal support. In low lumbar and lumbo sacral cases, the plaster is carried down to the middle of one leg. In a month's time the leg is freed, later the thigh.

In younger children where the graft is not strong, and in cases where the spines are short, or angulation marked, six months or more in bed are required, the spinal support is kept on for more than a year and only left off gradually under supervision.

(6) *Records of Cases.* A table of cases, giving the results so far as I have been able to ascertain them, is appended.

In one case laminectomy was necessary, the graft was afterwards placed in position so as to bridge the gap and unite two spines above and two below. I have done this in other cases and am convinced that a tibial graft is a most helpful accompaniment to a laminectomy whether for tubercle or other indications.

It may seem that undue emphasis has been laid on the pre- and post-operative treatment; but we feel that while the operation is in some cases the deciding factor in attaining complete immobilization, and always most effective in shortening the period of confinement to bed, its success depends on the efficiency of the associated treatment. During this period the operation is added to, but in no way a substitute for, the regular treatment. *The graft is only an effective splint when firm bony union is attained.*

Owing to pressure of work I have been unable to refer to the literature of the subject; this I much regret.

I wish to express my gratitude to Captain Morris, R.A.M.C., for his aid in collecting the material, and to Miss Hunt for her help in the general descriptions of the pre- and post-operative treatment customary at Baschurch.

Finally, to Colonel Sir Robert Jones, Captain Dunn, and Captain Aitkin, for allowing me to include their cases.

Patient's Name	Age at Date of Operation	Date of Operation	Surgeon's Name	Position	Present Condition so Far as Ascertained	If Still Wearing Support
Gilbert W.	14 years	Feb. 9, '13	R. J.	D. 5 to 7	Last heard of enlisting.	No
Lillie W.	35 "	March 8, '14	R. J.	Dorso Lumbar	Has occasional pain.	Yes
Jane D.	24 "	March 22, '14	R. J.	Lumbar	No pain. Works from 8 A.M. to 6 P.M. Walks 6 miles.	Yes
Annie B.	26 "	May 6, '14	R. J.	Lumbar	In regular work. No pain	During work only
James M.	34 "	May 6, '14	R. J.	Dorso Lumbar	Bed-ridden.	Yes
Mrs. Moon	28 "	May 6, '14	R. J.	Dorso Lumbar	Was doing well. Has since died of pneumonia.	
Wilfred N.	4 "	July 27, '14	R. J.	Lower Dorsal	"Quite a normal small boy."	No
Edith J.	6 "	May 9, '15	R. J.	Lower Dorsal	Can walk fairly well. No pain.	Yes
George P.	25 "	Aug. 22, '15	R. J.	Dorso Lumbar	Working as chauffeur. No pain.	Yes
Charles T.	34 "	Oct. 24, '15	R. J.	Mid Dorsal	Doing light engineering work. Can walk 4 miles. Slight pain.	Yes
Violet R.	7 "	Dec. 15, '15	Capt. G.	Low Dorsal	Going regularly to school. No pain.	Yes
Ada B.	10 "	Feb. 20, '16	Capt. G.	Low Dorsal	Can run and jump. No pain.	Yes
George C.	4 "	March 13, '16	Capt. A.	Dorsal	Can walk well. No pain.	Yes
Jack R.	10 "	April 30, '16	Capt. G.	Dorso Lumbar	Walking very well. At school. No pain.	Yes
Eddie D.	12 "	May 8, '16	Capt. A.	Lower Dorsal	Working in factory. Plays football. No pain.	Yes
Irene C.	6 "	June 11, '16	Capt. D.	Low Dorsal	Runs and walks any distance. No pain.	Yes
Kitty C.	14 "	June 25, '16	Capt. G.	Upper Dorsal	Died June 29, '16. Hyperpyrexia. Clear brain. Wound appeared perfect.	
George R.	12 "	July 10, '16	Capt. D.	Upper Dorsal	At school. No pain.	Yes
May B.	12 "	Aug. 13, '16	Capt. D.	Dorsal	Walks 5 miles. No pain.	Yes
Albert C.	9 "	Oct. 29, '16	Capt. D.	Dorso Lumbar	Walking fairly. Very delicate boy. No pain.	Yes
Violet D.	9 "	Nov. 5, '16	Capt. A.	D. 12-L. 2	Can walk 2 miles. No pain.	Yes
Sam R.	5 "	Nov. 19, '16	Capt. G.	Upper Dorsal	Doing fairly well. No pain.	Yes
Charles T.	4 "	Nov. 27, '16	Capt. D.	D. 7 to 9	Going to school. No pain.	Yes
Hilda T.	10 "	Dec. 31, '16	Capt. A.	C. 4 to 5	Can walk a long way and goes to school. No pain.	Wears Collar
Stanley G.	6 "	Feb. 25, '17	Capt. A.	D. 3 to 5	5 months after operation developed general T. B. Died.	

Patient's Name	Age at Date of Operation	Date of Operation	Surgeon's Name	Position	Present Condition so Far as Ascertained	If Still Wearing Support
Clifton C.	3 "	March 11, '17	Capt. D.	D. 6 to 7	Can walk half a mile. No pain.	Yes
Winnie B.	5 "	April 23, '17	Capt D.	L. 3 to 5	Walks well. No pain.	Yes
Walter H.	5 "	April 28, '17	Capt. A.	D. 8 to 10	Walking well and goes to school. No pain.	Yes
Tom W.	4 "	May 6, '17	Capt. G.	Mid Dorsal	Can walk. No pain. Health very very much improved.	Yes
Horace M.	3 "	July 13, '17	Capt. D.	D. 8 to 12	Walking well. No pain.	Yes
John G.	4 "	July 23, '17	Capt. A.	D. 10-L. 1.	Doing very well. No pain.	Yes
Horace R.	7 "	Aug. 13, '17	Capt. D.	D. 3 to 10	Walking very well. No pain.	Yes
Charles J.*	17 "	Aug. 26, '17	Capt. G.	Dorsal	Regained full sensation. Died during hip reduction under anaesthetic Aug. 4, '18.	
Private T.	34 "	Oct. 7, '17	Capt. D.	D. 12-L. 1	No better. Still in bed.	Yes
Jack C.	9 "	Oct. 14, '17	Capt. A.	D. 4 to 8	Walks well. Very delicate. No pain.	Yes
Horace B.	18 "	Nov. 4, '17	Capt. D.	L. 1 to 2	Walking well. Working. No pain.	Yes
Albert O.	9 "	Nov. 11, '17	Capt. A.	D. 1 to 4	Not yet up on account of temp. and spasm. Much better.	Yes
Pensioner G.	26 "	Nov. 18, '17	Capt. G.	Low Dorsal	Walking well for an early case.	Yes
George O.	4 "	Nov. 25, '17	Capt. G.	D. 8 to 11	Walking well.	Yes
Doris W.	4 "	Dec. 3, '17	Capt. A.	C. 6-D. 2	Walks very well indeed.	Yes
Ralph H.	9 "	Jan. 6, '18	Capt. A.	Mid Dorsal	Walking well.	
Gladys L.	12 "	Jan. 13, '18	Capt. G.	Low Lumbar	Walking well in plaster with one hip fixed.	
Lizzie S.	5 "	Jan. 27, '18	Capt. D.	Dorsal	Died, evening Jan. 27, '18, with hyperpyrexia. p. m. Spines extremely short, graft in contact with cord.	
Maria T.	11 "	Feb. 10, '18	Capt. G.	D. 12-L. 1	Doing well. Off frame, in back support, but not walking yet.	
Robert W.	9 "	Feb. 17, '18	Capt. A.	D. 8 to 12	Doing well. Still on frame.	
Miriam C.	8 "	March 10, '18	Capt. G.	L. 1, 2, 3	Doing well. In back support. Not up yet.	
Horace W.	13 "	April 7, '18	Capt. G.	L. 1 to 4	Still on frame.	
Douglas A.	9 "	April 21, '18	Capt. D.	D. Lower 6	Still on frame.	
Sydney M.	6 "	May 19, '18	Capt. D.	L. 4 to 5	Still on frame.	
Pensioner S.	20 "	June 23, '18	Capt. A.	L. 3 to 4	Still on frame.	

* Graft combined with laminectomy for complete sensory and motor paralysis.

DISCUSSION.

THE PRESIDENT: This is a record of very good work, and it is a very interesting paper. In the list of cases put on the screen, I notice that one of the patients afterwards played football, which is a good proof of the stability of the scar. I hope we shall have a good discussion on the paper.

CAPT. MCCRAE AITKEN: I think we must congratulate Mr. Girdlestone on his paper. His description of the technique, especially of the preparation beforehand, and the after-treatment, is very important. There is no doubt whatever that the bone-grafting operation, both for tubercle and for certain cases of fracture, is one which will remain in the routine armamentarium of the orthopedic surgeon.

I came in late, and therefore do not know if he laid emphasis on one particular operation in which he performed laminectomy first, to relieve pressure on the cord. (Mr. Girdlestone: Yes.) That case I have seen and it is one which has been exceedingly interesting to me. We are all familiar with those cases of caries of the spine in which an apparently satisfactory convalescence is interrupted suddenly by an impairment of facility in walking, by an increase in the knee jerks, and by that varying quality of the Babinski sign, the extensor plantar reflex. I do not know whether Mr. Girdlestone laid down any definite rule as to when laminectomy should be performed. My own experience in such cases has been that those in which there are merely motor disturbances generally recover, but in those cases where, in addition to interference with the reflexes, there are sensory disturbances, there has been a fatal termination. And in such cases, following on what I have seen of Mr. Girdlestone's case, I should be prepared, in future, to at once perform laminectomy, even if I had not yet got that spine sufficiently straight to satisfy me that the best time for performing the Albee operation had arrived.

With regard to the points of technique in the operation itself, there is no doubt whatever that the condition of the spine has been infinitely better since we have abandoned the use of the hammer and chisel. There was almost always a certain amount of shock during the process of splitting spines with hammer and chisel, and the difference in the condition of the chidren two hours after the operation is so great that I do not think there can be any question on this point. The great difficulty of estimating the depth of the curve of the spine, is one which always faces us. I am, personally, very shy of using a saw with any force over the summit of the deformity, because as a rule there is a very short spine in that region. I content myself, therefore, with simply nicking the spine in those cases, and, as Mr. Girdlestone has pointed out, complete the severance with the chisel and split open the spine. The point is to get the raw bone area, the layer of muscles and ligaments over the graft, with subsequent suturing. Mr. Girdlestone's paper has dealt mainly with cases, mostly civilian, performed at Baschurch, though some have been in soldiers. This operation has, of course, a place in military surgery, because we have had a fair number of cases sent in to our military hospitals with fractures of the spine, with increasing deformity, localised at the seat of injury at the back, with increasing caving in of the bodies due to inflammatory changes in the bone following injury by a bullet. These are to be treated by us, I think, as absolutely parallel cases to those of tuberculous caries. I have had in the last 18 months three cases at Shepherd's Bush, on which I have performed the same operation exactly as described by Mr. Girdlestone, with varying success. In one case, a considerable portion of the graft showed in the wound, and it looked quite white. In this, as in most cases of military surgery, I paid no attention to a graft that showed white in the wound: it is when a graft begins to go black that I do not like it. I think the white grafts granulate over, and the wound heals over them, and the bones in those cases subsequently become incorporated in the underlying bone, throwing off as a sequestrum only a portion of the scaly hard surface of the hard bone

of the tibia. I do not know whether others have had similar experiences; no doubt they have. All I have to say further is to thank Mr. Girdlestone for a very interesting paper.

MR. W. H. TRETHOWAN: I confess to having felt some disappointment over Mr. Girldestone's paper. It seems we have been discussing details, such as whether we shall use a hammer and chisel, and so on, and whether scars go white, or go black, and so, I think, we have got lost in details. The essence of the thing—and what I expected Mr. Girdlestone's paper to give us—is: Are the results of this Albee operation good? Do they warrant us allowing it to supersede the older methods of splinting? In essence, Albee's method is one of internal splinting, instead of external splinting. To submit a child with grave disease like tuberculosis to a radical and severe operation when it is not absolutely necessary is, to my mind, appalling. We have listened to Mr. Girdlestone's operative details, but he should remember we are not a collection of general practitioners, we are operating surgeons, and hence we know how to deal with operative details reasonably. I submit that it is a waste of time to deal with those things here. We should not discuss details of splinting, whether in the neck or in the lumbar region. We all know how to splint a case of spinal caries, or at all events we ought to. If there is employed the careful splinting which Mr. Girdlestone is forced to use, in addition to his operative measures, he should get success with those measures. To introduce an operation in this scheme of treatment seems to me unnecessary. We don't want to know about hammer and chisels; we want to know whether this method is any good, as compared with others, whether it contrasts favorably with the old splinting method. I have not done Albee's operation; I like, as much as anybody does, an operation where there is use in it, but this seems to be one of those useless procedures which we might call carpentry—I might use another term, but I will not now. To do an operation like that, merely for the sake of operating, to go into the workshop to play with hammers and other tools, is not right when we have got other methods which, apparently, we have to use as well, even though we do carry out this particular operation. I would like to know, from people who have had experience of both methods, whether the Albee method saves time, whether we are really warranted in subjecting a child to all this increased risk which is implied in doing this operation. I contend that the man who can use his hands properly ought to be able to splint up a back. We also know how to take casts, how to make nice jackets, we can splint them up and then immobilize them in that way. A year ago I asked Sir Robert Jones himself: I said to him, "Do you save time by operating on children by the Albee method?" He said, "No, I do not think we do at all." He may of course, have changed his opinion since. What I want to know, therefore, is when people do Albee's operation, when they tinker with hammers and chisels in that way, do they save time? I do not think so. If these children are splinted properly, they do very well, and I think that is all that is needed in the general run of cases. Does this save time?

THE PRESIDENT: That, I think, is the point to discuss, the other matters are beside the question.

MR. BENNETT: I was somewhat in the same mental attitude towards this operation as that which Captain Trethowan has expressed. I went over to America to see what they were doing there. I saw Albee doing it. I did not bring his apparatus. It was in 1913. I, however, evolved something which would take its place, that is, some other apparatus. It was in the form of a circular saw, and I started doing the operation on his lines. I could probably follow the technique of Mr. Girdlestone pretty accurately, because it was definitely laid down by Albee. I have now done it in about one hundred cases, so I have had the opportunity of seeing what the results are during the past five years. In children I have not, so far, had

a fatal case. One, of course, loses sight of some cases. But I can tell Captain Trethowan that in the majority of the cases we have saved the child patients two years, because the treatment of spinal caries takes three to five years. I think we are agreed as to that fact. Yet after this method I have seen children, after nine months, playing about with other children as if they were normal. I do not say that happens in every case; much depends on the type of case. But a sturdy little boy, full of *joie de vivre*, who will not keep quiet, will do that, and I have been astonished to see the results. I think I can reassure Captain Trethowan that you can definitely save time by this operation. The further question is, is it, apart from the time saved, worth the danger of doing it? Is it a dangerous operation? No, it is not. It is a simple operation, much simpler than Hibbs' operation, which at first was regarded as a simple procedure and requiring only one incision. But afterwards I found that that one incision involved so much manipulation that I came to the conclusion that Albee's was a much simpler operation. I have tried to simplify the operation in this way: I have many children to deal with, and I have two or three cases in a morning, so that I can take away what I require; I can split the tibia into three pieces, and give each one of them a small piece, so that instead of six operations it means four, and it is so much better for the child whom you have relieved of the tibial part of the operation.

With regard to the after-treatment, I take it in this way. The bone takes eight weeks to unite, and I give them another eight weeks to make sure of good union. But it is not really the bony part which matters so much. I think the part we are apt to neglect is the fact that we bind muscles and fascia over that. And beyond the purely osseous portion, between spine and graft you have all that fascia bound down by strong kangaroo tendon, which I pull very firmly. That is one of the most important elements in this operation; it is, I feel, a very important factor. When I have had a fairly strong case, which I felt I could operate on with safety in this way, I have taken a double graft from his spine, and taken the remainder to another hospital to put into another patient, without in any way inconveniencing the patient who has been operated upon and who has given the grafts. In giving grafts to children from adults—I have chosen that when I could—I have never seen the graft come away from the child. In the whole of the time I have mentioned, I have only seen four grafts drop. One was in a boy aged 18, and that graft was wrongly taken. I stripped the periosteum. If you do strip the periosteum, there is a likelihood of the graft dying; therefore in doing this operation, be very careful of the periosteum. I would like to hear the opinion of Mr. Girdlestone and others on that point, because it is only by relating our experiences that we can be helpful to each other in that way.

CAPTAIN PLATT: I thing Mr. Trethowan's homily was a timely one, although I do not agree with him in all he said. It would be impossible to establish, by a series of statistics, the superiority of Albee's operation over the ordinary conservative method; at any rate it would be difficult to prove. But from a general impression of the results of this operation, I think certain facts have been established.

In the first place, with reference to tuberculosis of the spine in adults, this operation is not only desirable, but one feels it is urgently needed, and those are among the most brilliantly successful cases. Then again, in very young children—those under five years of age—this operation is certainly undesirable. But in the ordinary child with a tuberculous spine, and perhaps especially in the case of the child who has to be treated in the city out-patient department, any operation which has been proved—as this has—to shorten the period of treatment is an operation to continue to perform.

Another point to remember is, that the conditions at Baschurch where Mr. Girdlestone's operations have been done, are ideal; the patient has come to this hospital, which is in a country district, some time before the operation is to be undertaken, and the after-treatment is carried on under the same

exceptionally favorable surroundings, therefore the functional results should be of the highest order.

CAPTAIN WINNETT ORR: I have seen a good deal of both methods of treatment. There is a definite field for the Albee operation. Having done it a few times, and having stood by the table while Albee did it a few times, I will venture the opinion that the operation is justifiable. I am betraying no secret when I say it is possible for children with Pott's disease to recover in from six to nine months. We have seen them recover entirely useful backs in less than a year. For a patient under the Albee treatment to recover in 6 to 9 months is not regarded as in any way miraculous. In an experience of 300 cases of Pott's disease I have done the operation on my own cases three times, and I have regarded it as often enough. In some cases, especially in adults, where there is persistent delay in recovery under the conservative methods of treatment, the fixation of spine which may be secured, especially where there is involvement of two or three vertebrae, by the Albee operation is desirable, as it contributes to shortening the period for recovery. But I have rarely seen cases in children under five or six years of age in whom I felt the operation was at all justifiable. The operation is, after all, a comparatively simple one, and yet every report read on this subject betrays the fact that there is a risk, because some of the patients never recover. To reduce the cases in which the Albee should be done to the mimimum is better than becoming enthusiastic over the operation, because in the latter case you will be liable to do the operation a few times too often.

MR. MCMURRAY: I have had some experience of the Albee operation. I have 250 children in one hospital with tuberculous spine, and 150 cases of tubercular diseases of bones and joints. We have, there, the best open-air hospital in the world. These cases are treated out of doors all day and all night; they have only been inside on five nights for a period of five years. The chief surgeon there is Sir Robert Jones. Sir Robert Jones brought this treatment to Baschurch; we did it there, and we stopped doing it; it may be that we were wrong in stopping it, though I do not think so. There is only one kind of case in which it is the ideal operation, and that is in the adult, and especially one with affection of the lumbar vertebrae. You cannot fix the lumbar spine in an adult by splinting, it can only be done by means of graft. To go and operate on every child who has a tubercular spine is to do the kind of thing which brings orthopedic surgery into disrepute; it is apt to bring about that state of mind which leads people to say "These hospitals should be shut." When we have cases in the out-patient department we know when we have fixed them properly on the frame that they will not develop abscess, or paraplegia, or loss of control of bladder or bowel, but that they will go on and become perfectly well as a matter of course. They all do; it is not a question of one here and there doing so. And the cases in which this Albee operation has been done have to be treated in exactly the same way afterwards; support must be kept up for at least six months, and there has been pain in the legs after operation. I have seen a dozen cases operated upon by the Albee method in which pain has been experienced in the legs after the patient has been running about, although the child had had six months' rest after the operation, so that it was necessary to put the child back on the frame. This operation may save three months, but that is nothing to a child with tubercular spine. I should like to know from Mr. Girdlestone why he put the child in the frame and then had a little felt with a hole in its centre, and gradually took that away. The reasonable thing is to gradually put the felt in. You have that fall to the back of the frame and gradually push the spine up again until you get hyperextension; that was the idea of the felt,—to raise the spine up, and let the shoulders and pelvis fall down, then there will be a straight back. But you cannot get that on an ordinary frame. He also described how you put a plaster jacket on. The simplest way is to put the child on to its face,

with its head over the edge of the table, and cover the child with the jacket to its heels, make the plaster, and mould it to half the body over its whole length. Then take the plaster trough off after it dries, and when dry it will be the exact shape of the child, and by putting layers of felt into the space you can raise up the spine again, and so obliterate the curve. This leaves the front of the chest free, so that the child is much more comfortable.

MR. GIRDLESTONE, in reply: Captain Aitken, in the course of his kind remarks, mentioned laminectomy and the indications for carrying it out. I am not in a position to lay down any rules at all about it, because I am here to learn. I merely made a statement as to what I have learned at Baschurch; the paper is not a setting out of what I am trying to teach. But I agree with what has been said about laminectomy, that it is only exceptionally needed, and then when sensation is involved, especially when the sphincters are affected, because the experience is that those cases generally get worse. After this operation, however, as you will have seen by the charts I showed, indicating the return of sensation, and the function of the sphincters, the laminectomy has been perfectly successful, and the patient is getting well.

In reference to Mr. Trethowan's remarks he asked why the paper was inflicted upon him. I ask him to raise that question with Captain Platt. His second question was as to whether the operation shortened the period of treatment. I tried to make that point clear in my paper, but, apparently, I did not succeed. The great theoretical advantage of the operation is, that the splint stays with you. If you have bony union of a strong tibial graft to the spinous processes of the vertebrae, there is no tendency for a crushing action due to the weight of the body; you have got a spine perfectly splinted, and I think that is the important point. Certainly the child who has had an Albee done stays a less time in bed. If you take a case of tubercular caries and operate upon it, it is up in four months if it has no marked kyphos, and a strong spine where you apply a strong tibial graft. We have had no signs of recurrence in these cases. Under other circumstances, however, you could not, with safety, get that child up under a year or even 18 months.

The other point is, that that is not the kind of case for which the operation is most needed. The case it is most needed for is that in which the other treatment does not yield good results. If the child gets apparently well on a frame, is got up, and there is a relapse, then the Albee graft is done, and after that, when the child is got up, the condition does not come back again, at least there has been only one instance in which it did come back. But the main point is, that with the Albee you take your splint with you, and when the patient gets up, the bones are not subjected to a crushing action.

The third factor in the argument concerns the time element. I shall be glad for every member to read carefully the analysis of the fifty cases of tubercular caries on which my paper was based; the patients were up and about in one-third of the usual time; it shortens the bedridden period by two-thirds.

As to blue, black and white grafts, I think only one graft has been seen at Baschurch, and it was cut off. That was black. But that remark of Mr. Trethowan's may be regarded as a bit of poetic license.

Mr. Bennett remarked on suture of ligament over the graft. Possibly that is of value, but to procure bony union seems to be the main thing.

Captain Platt suggested that the operation is more valuable in adults than in small children, and with that I cordially agree. And I specially agree with what Mr. McMurray said concerning the lumbar spine. With the cases of lumbar spine and using a big graft, one gets an ideal result in a very short time. But I was surprised to hear that Mr. McMurray cannot control the lumbar spine by splinting. We use plaster of Paris, and, so far as I know, that controls the lumbar spine, though not for walking purposes.

INTERNAL DERANGEMENTS OF KNEE-JOINTS.

BY CHARLES F. PAINTER, LIEUT., J. G., U.S.N.R.F., CHELSEA NAVAL HOSPITAL.

THERE are two periods in young manhood when there seem to be an unusual number of injuries of the knee-joint which come under the heading of "internal derangements." These are at the two extremes of adolescent life. There is a notably greater incidence of semilunar cartilage displacements in the period of boyhood when football is first played as a part of organized athletics in public, high, and private school life. Boys at that age, if they are big and husky, are promising candidates for football teams, but are too poorly knit together to withstand the hard knocks of the game as it is played by young men in late adolescence, that period covered by collegiate training. This is noticeable in civil practice. On entering the service of the Navy I was quite surprised to find so many cases of semilunar and other knee-joint injuries among young men of from 20 to 24 or 26 years of age. On analyzing the cases it would appear that the greater incidence of these in this period and in naval service is due to the strenuous existence led by these young men and the traumatisms incident to the service and the athletic contests in which Navy men engage.

The more common injuries among these men are semilunar cartilage displacements, injuries to the bursa beneath the biceps femoris tendon just above its insertion into the fibula, and hypertrophies of the alar ligaments.

These lesions all give symptoms more or less alike so far as the subjective features are concerned. Their objective signs may not be notably different except in the case of the bicipital bursae.

The failure to discriminate between these lesions and simple traumatic ruptures of the lateral ligaments of the knee-joint or synovitis of the knee are often attended by consequences which may be more or less serious, is shown by one of the cases reported later on in this communication. In this case the diagnosis had been "undetermined" for several weeks and the patient had been returned to duty; he had fallen twice because the knee suddenly gave out under him and he was sent to the sick bay with a diagnosis of fracture of the humerus. On another occasion he dislocated a thumb in the same manner. He had been confined in the hospital, or away from duty because of "leave" granted after these injuries, for several months all told. This represented a distinct loss of service to the Navy Department and an ex-

pense for carrying this man the 14 months which had elapsed since the injury, most of which might have been avoided had the correct diagnosis been made when it was first possible to have made it.

Semilunar cartilage injuries are of two kinds. In one variety the ligamentous connection between the tibia and the face of the semilunar cartilage is torn away and the cartilage acquires a mobility which permits a catching in the joint at times, but seldom any locking of the articulation. Associated with this catch there is usually an effusion; almost always in the early repetitions of the catching. There is pain at the time and lameness, with a definitely localized tenderness along the line of the ruptured ligamentous connections with the cartilage.

This second class of cases is concerned, as is the above, with the internal meniscus of the semilunar cartilage in a great majority of cases, and besides having had the anterior ligament torn away, the cartilage has been fractured. As a result of this there is a free end of cartilage which flaps in and out of its normal position. This free piece may be detached from its anterior ligamentous connections for as much as an inch or an inch and a half. This break occurs at about the same place in all instances, *viz.*, at the junction of the inner and middle thirds of the internal meniscus. The free end sometimes turns up at right angles to the direction in which it normally lies and projects itself in between the femoral and tibial condyles where it becomes shredded by the traumatism of repeated crushes. This is observed more particularly in the old untreated cases. An inevitable effect of the looseness of this cartilage is injection of the synovia in the region traumatised, effusion into the joint, repeated with every redislocation, resulting at last in more or less thickening of the synovial membrane, and traumatism to and hypertrophy of the alar ligaments, causing an interference with the function of the joint from this alone. It is impossible to cause an injury which will tear or rupture the semilunar cartilage when the leg is fully extended unless it is associated with a fracture or dislocation of the knee-joint proper: the force which produces it must be delivered while the leg is flexed to some extent and the pressure exerted upon the outer side of the knee or the inner side of the leg, directed either inward, or upward and outward, as the case may be; if, when the foot is held immovably on the ground and the body turned forcibly outward, *i. e.*, in the reverse direction of the hands of a clock as regards the knee in question, and at the same time the leg is slightly flexed, the cartilage may be dislocated. Rarely the outer semilunar meniscus is dislocated and causes the same set of

symptoms referred to the outer aspect of the knee. This external dislocation is frequently associated with bicipital bursitis, the cartilage being found protruding into the bursa through the opening which so frequently connects the bursa with the knee-joint.

Given a history of injury to the knee-joint sustained in the manner above described, and especially if under similar provocation there is repetition of the initial symptoms of pain, effusion, disability, flexion deformity and tenderness referred to the internal or external meniscus, one is reasonably sure of the diagnosis of a semilunar dislocation. This needs to be distinguished from osteochrondritis dessicans (the ordinary "joint mouse") and hypertrophied alar ligament fringes.

Radiographic studies will assist in this differentiation and here it may be remarked that it will be found of much assistance in employing the x-ray to determine the presence of a displaced semilunar cartilarge by the ordinary methods of exclusion of other things if oxygen is injected into the quadriceps pouch. This separates the synovial surfaces widely, leaving an absolutely black space wherever the joint surfaces could be separated, and if the cartilage is loosened from its moorings, the oxygen will work its way in behind it and show a black area there also. These appearances are identical with the black areas one sees in x-rays of the intestine where gas has accumulated. Bodies possessed of any opacity are thrown into high relief against this background. This method I first saw in use in the clinic of Major-General Sir Robert Jones of Liverpool, England. It has the merit of furnishing positive instead of merely negative evidence in a majority of cases of semilunar cartilage displacements. Once this diagnosis is made after careful study and examination, there is no treatment at all satisfactory except excision of the displaced meniscus. Every knee-joint should be gotten ready for operation by a two-day local preparation, and by the administration of 20-25 grs. of urotropine per day for two or three days before, and four or five days after operation. The technique of the operation is simplified if done with the leg flexed. The incision which affords the best exposure in a majority of instances is a slightly curved one with the curve toward the median line at its lower third. The upper two-thirds is parallel with the long axis of the femur and tibia and crosses the line of the joint after it has commenced to curve at a point over the juncture of the middle with the inner third of the internal meniscus. Nothing but instruments should be inserted within the joint and it is better to perform the operation under a tourniquet. On only two occasions have I seen a hemorrhagic

effusion in a knee-joint after this operation when done under a tourniquet. If the vessels are caught up before the capsular stitches are taken, any possible trouble would be avoided, and the advantages of the clean field, which are secured by the use of the tourniquet, would be gained.

The capsule should be closed separately from the skin and without drainage. The first dressing should be applied with firm compression from an elastic bandage. Fixation in a cast or ham splint is not necessary, and early manipulation is desirable. At the end of a week passive attempts to secure flexion should be made and by the end of the second week right-angled flexion should be possible. When this has been attained, walking may be permitted and by the end of the third or fourth week at the most, good function should be restored. Massage and resistive exercises should be directed to the thigh muscles (extensor and flexors) for a long period after the operation or until there is practically no atrophy remaining.

The diagnosis of hypertrophied alar ligaments is suggested when, after a trauma to the front of the knee-joint, or a severe strain unaccompanied by any history of locking at the time of the injury, the joint shows local swelling on either side the patella, and slightly below it. There is rarely any effusion in the articulation, but capsular thickening is quite common. The symptoms develop progressively two or three days after the injury and consist of pain or ache in the joint, particularly after standing or walking for a time. Complaint is made of a feeling of distention in the joint and stiffness which develops after keeping the leg in one position for a considerable time. When the trouble is marked there is often a sensation of pinching in the joint, but the carrying out of the motions is not prevented as it is in the semilunar dislocations. In the very chronic cases there may be some continuous inability to completely extend, but without pain or sense of locking.

If such persons are put to bed at the first of the trouble, within two or three weeks of the time that the trouble starts or a diagnosis made, a cast applied so that no further trauma may result to the hypertrophied ligaments, the proliferated tissue will be absorbed and the ligament be restored to its normal size. These injuries are purely traumatic. The initial trauma may be slight, but once the ligament becomes hypertrophied it is very easy through the every-day use of the joint, to add to the original injury little by little and create a situ-

ation which is hard to be recovered from, necessitating operative interference in some instances.

The alar ligaments serve as automatic distributors of the synovial fluid over the face of the femoral condyles. They are covered by synovial membrane and are made up of a mixture of fat and connective tissue, in such proportion and so arranged that a very plastic sort of a sweep is made useful for the purpose of keeping the synovial fluid properly distributed.

Trauma causes proliferation of both the fat and connective tissue elements and the entire ligament becomes converted into a gristly, hard substance that easily gets in the way of the flexion and extension of the leg. The synovial membrane becomes congested and injected, as does the synovia in the immediate neighborhood where the hypertrophied alar ligaments chafe against it.

If operative treatment is indicated,—and it is in the chronically irritated ones at any rate,—the best route to approach them is through a lateral incision on the inside of the joint, starting close up to the muscle near the top of the quadriceps pouch, and about half way between the edge of the patella and the adductor tubercle. With good retraction the hypertrophied ligaments are easily exposed and with scissors may be dissected out from the space between the front of the femoral condyles, the face of the tibia, and the inferior surface of the patella. Hemorrhage (venous) from this may be annoying, but can usually be controlled by washing out with hot water. The preliminary and post-operative treatment should be the same as in the semilunar lesions. After removal of the stitches the joint should be manipulated daily until full motion is restored. Because of denudation of synovia a tendency to the establishment of adhesions is rather more noticeable here than after semilunar operations, and therefore attention to the "follow up" treatment is imperative. Prognosis is good in these cases.

The third lesion referred to above, *viz.*, bicipital bursitis, is apparently a purely traumatic affair but the trauma is that of the inordinate use of the biceps femoris, combined with the fact that there is a minute communication between this bursa and the knee-joint. The typical bursitis is shown by swelling, the size of a twenty-five cent piece, over the outer aspect of the knee-joint beneath the tendon of the biceps and about one-half an inch above its insertion into the fibula. This is hard, tense, and full of a gelatinous material. The lining of the bursa is commonly somewhat thickened. Apparently when a trauma is in-

flicted upon the outer side of the joint the external semilunar may be dislocated, and as the normal communication between the bursa and the joint opens right at the insertion of the cartilage along the head of the tibia, I have on two occasions found a portion of the semilunar actually pushed out into the bursa through this opening.

The symptoms of this bursitis are pain over the region described above and tenderness to pressure. Sometimes the patients limp a good deal. In the Navy it has seemed to me significant that all the cases seen have been in seamen who have been obliged to climb up and down ladders a great deal, which is an exercise calling upon the biceps femoris for a good deal of work. It may well be that this, coupled with the fact that a communication with the knee-joint is of very frequent occurrence, would account for stirring up the bursa, and attracting fluid into it from the knee-joint.

The operative removal of this is the only method of treatment that gives permanent relief. The bursa should be dissected out and tied off from the knee-joint. Care should be used in the dissection because the external popliteal nerve is close to the head of the fibula and the biceps tendon; it has been injured in this operation with a troublesome peroneal paralysis.

The following cases are the ones referred to earlier in this paper and are cited chiefly to indicate the importance of an early diagnosis in troubles involving the knee-joint.:

Case 1. J. F-2. 22 years. March 29, 1919. While hoisting a timber with a jigger beneath a wharf the stick struck his lower leg from below and forcibly drove it up and out, knocking him off the girder upon which he was standing. Could not straighten the knee, but was able to go to "sick bay" of his own accord. Iodine was rubbed on it but nothing else was done. For ten months there was nothing else done for it, and then he was sent to the City Hospital on Blackwell's Island, but no recommendation for treatment was made, though at that time the leg was flexed and could not be extended. Shortly after this he was able to secure extension of it by his own efforts. After that he was sent back to duty and repeatedly since then there has been a re-dislocation of the cartilage which he has been able to manipulate back into place himself, but until he does there is no power to extend the leg completely. Sometimes it dislocates several times a day. Sometimes a long time may lapse between times. There is now no swelling connected with the dislocation, but pain invariably. The last time was a week ago. There have been a dozen or more x-rays taken which are said to be negative.

Physical Examination. Well developed and nourished man. Left knee appears normal, though the thigh and calf are slightly atrophied. In the sulcus between tibia and femur can be felt a resilient, slightly

movable mass where the internal meniscus of the semilunar lies. It is slightly tender over this place. There is no swelling of the soft parts or effusion in the joint. Flexion and extension of the leg are normal in extent and without spasm of muscle.

Diagnosis. Dislocated internal semilunar cartilage.

CASE 2. S.P.G. U.S.M.C. 27 years. Christmas Day, December 25, 1916. In practicing high jumping he fell on the left knee, striking on the side, with the leg in a position of flexion. Had to be picked up and carried to quarters. Leg could not be completely extended for three months. There was much swelling and pain with tenderness over the inner aspect of the left knee.

He remained in bed with knee bandaged for four days, and was then returned to duty on December 30, 1916, with diagnosis of sprain. On January 6, 1917, reported again to "sick bay" because of synovitis and pain in knee. Then was transferred to hospital where the diagnosis of synovitis was continued. He was kept in bed ten days where he was given exercises and massage. On January 17, 1917, there was limitation in motion in flexion of the knee. On the 28th there was still some swelling and disability. On March 9, 1917, it is recorded that he was "exercising freely without marked discomfort." He was discharged to duty on this date.

From that time to November 18, 1918, no mention in his health record of any further trouble with the knee-joint, though the patient says that after March, 1917, when the hospital discharged him to duty with a diagnosis of sprain of the knee, that there had been about a dozen occasions when there had been a slip in the joint accompanied by pain, swelling, and limitation in motion. In the above mentioned interval he had had the diagnosis of mumps, urethritis, influenza, and chronic articular rheumatism.

On the third of March, 1919, he had a displacement of something in the left knee-joint, which was accompanied by effusion and pain. At that time he stated that from time to time this had occurred during the previous three or four months, with comparatively little provocation. He could do no bayonet drill without causing a slipping of the cartilage.

On the 12th of March I had opportunity to examine this man's knee. He stated that there had been recently three or four slips of the same sort that he had been having before. There was a moderate effusion; tenderness over the inner meniscus of the left semilunar and a palpable mass to be felt filling up the sulcus between the tibia and the femur. Forced extension and flexion are slightly painful. Calf and thigh show slight atrophy.

In view of the history and physical signs, it seems certain that this man's semilunar cartilage had been displaced on Christmas Day, 1916, but the diagnosis has been carried as "synovitis" or a "sprain," so far as the knee-joint lesion was concerned, ever since.

THE STANDARDIZATION OF JOINT RECORDS.

BY J. APPLETON NUTTER, M.D., MONTREAL, CANADA.

[From Clinic for Functional Re-education, New York.]

In a previous article (*Journal American Medical Association*, "Reconstructive Surgery—Problem of Records," February 8, 1919,) it was shown how finger deformities could be graphically recorded without sacrifice of accuracy or intelligibility, and with the gain of rapidity.

The writer has become strongly impressed with the necessity of adopting some standards by which joint movement and deformity may be recorded with a possibility of being understood. It is, of course, accepted that joint movements should continue to be recorded in terms of degrees, 90° standing for a right angle. Where this movement is to take its beginning is one problem that demands early solution.

For example, at the Clinic for Functional Re-Education it has been the custom, in measuring pronation and supination, to regard the position of "thumb up," the palm and dorsum of the wrist facing to one side and the other, as the neutral position. Pronation and supination are measured in terms of degrees from this neutral position.

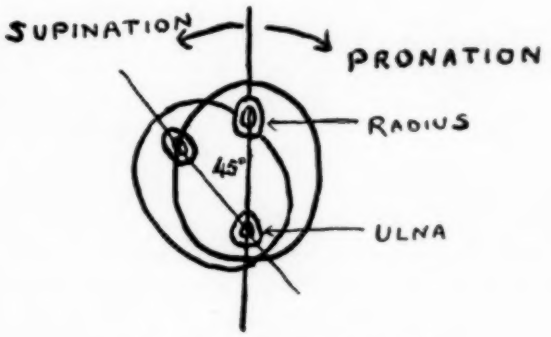


FIG. 1.—RIGHT WRIST, THUMB UP.

This diagram represents the right wrist cut across just above the carpus, showing the lower ends of radius and ulna. Diagram indicates the neutral or "thumb-up" position, also 45° of supination.

In the neutral position, the thumb being uppermost, the radius will be directly above the ulna. As the hand is pronated and supinated the radius will describe an arc of a circle around the ulna to one side or the other. One can accordingly record that only 25° of voluntary pronation is permitted beyond the neutral position, and for example, 90° of voluntary supination. This written description is of itself sufficiently

easy to understand if the neutral position is known and accepted. If, however, the written description is accompanied by a diagram such as follows, it would seem that the condition would be still more clearly portrayed.

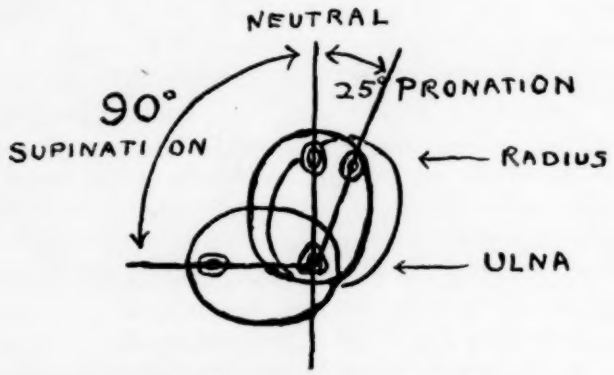


FIG. 2.—RIGHT WRIST, THUMB UP.
This diagram illustrates range of motion in a right wrist amounting to 90° of supination from the neutral or "thumb-up" position, as well as 25° of pronation.

One problem that has created havoc among our aides has been to record a deformity where, for example, a forearm is held in marked pronation permitting of a few degrees only of motion towards the neutral position. Attempts to record such a condition in terms of degrees aided by descriptive language have not been usually successful as regards being understood. It goes without saying that the most elaborate description fails in its purpose if it is not easily understood by others than the writer. One has seen records that could be understood by many of the staff of a given hospital, but certainly could not be understood by a visitor to that hospital. In other cases it seems doubtful whether the records could be understood outside of the very room in which they were made.

In the Clinic for Functional Re-Education many attempts have been made to record pro- and supination in such a way as to combine accuracy with the greatest possible clearness. It was desired to have records that could be understood by an aide with only a minimum amount of anatomical knowledge. A condition as mentioned above—marked pronation with a few degrees of motion permitted towards the neutral position—would be recorded as in the following diagram.

The recording of the limits of forced movement in addition to voluntary movement has not been introduced in these diagrams for fear of

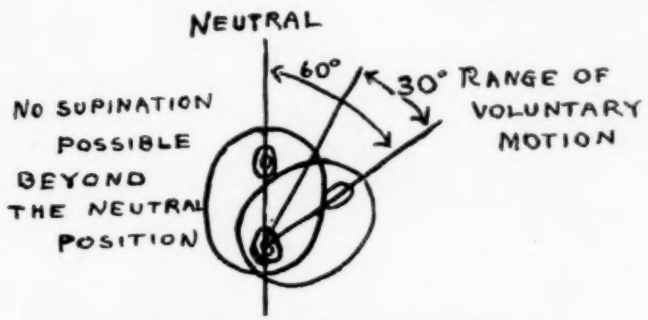


FIG. 3.—RIGHT WRIST, THUMB UP.

Arm shows active pronation to a point 60° beyond the neutral position of "thumb-up," with 30° voluntary motion from this point towards the neutral position. Or one could describe the same condition more briefly by saying that the arm shows voluntary motion in either direction between the points of 30° and 60° of pronation.

sacrificing clearness. It is, however, the custom of the Clinic to record passive (or forced) as well as active (or voluntary) movement. This is generally done in the same diagram.

In recording elbow movement it would seem that full extension, the upper arm and forearm being in one straight line, offers the best position from which to measure joint motion. The term "full extension" is usually employed in the description, as for example, "patient's arm lacks 20° of full extension." The writer is aware that in some clinics "full extension" is termed "180 degrees of flexion." This emphasizes the need of defining "flexion."

Flexion in the Clinic for Functional Re-Education is measured from this same position of full extension, and a man who can flex his elbow to a right angle is recorded as having 90° flexion. It is often the cus-

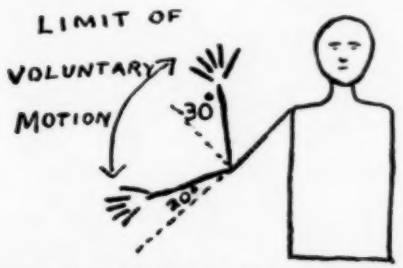


FIG. 4.—RIGHT ELBOW, SHOWING LIMITS OF VOLUNTARY FLEXION AND EXTENSION.

Full extension lacks 20°. Flexion to 30° beyond the right angle. In some clinics this would be termed "motion from a position of 60° flexion to one of 160° flexion." This diagram would probably be intelligible in any clinic where a written description might fail to be understood.

tom, especially when one of the staff has returned after examining the records of another hospital and found how easily it was to misinterpret, to make a graphic record such as follows. We will suppose a patient, who, after a dislocation of the head of the right radius, lacks 20° of full extension, but can flex to 120°, or 30° beyond the right angle.

A written description is somewhat more difficult to understand when the range of motion is limited, as for example, in the case of an elbow held habitually in a position lacking 30° of full extension, but capable of being flexed 20° from this point. A diagram of such a condition follows.

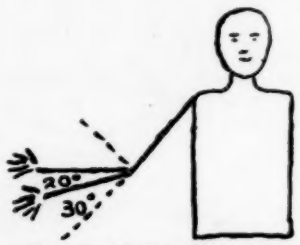


FIG. 5.—RIGHT ELBOW.

Diagram representing extremes of voluntary motion in the direction of flexion and extension. Full extension is lacking by 30°, and from this point 20° of voluntary flexion are permitted. Some would describe this as "motion between the positions of 130° flexion and 150° flexion of the elbow," where a fully extended elbow would be counted as 180° flexion. A diagram makes plain what is meant.

In the case of shoulder movements the difficulty seems to be largely one of agreement as to what constitutes flexion, abduction, etc. One finds a given movement described in many different ways. The most important movements of the shoulder seem to be abduction or raising the arm from the side away from the body, the so-called side elevation, and flexion, or raising the arm forward from the body, so-called forward elevation. Following this terminology logically, adduction of the

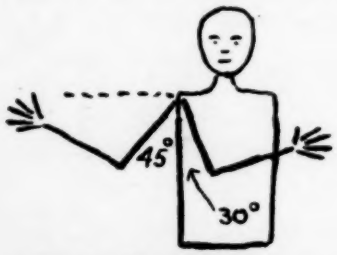


FIG. 6.—RIGHT SHOULDER.

This diagram represents the position of 45° abduction at the shoulder joint and that of 30° adduction at the shoulder.

shoulder would be putting the arm across the chest, and extension would be the movement which carries it backwards. Both flexion and abduction when carried to the full, raise the arm to the vertical position,

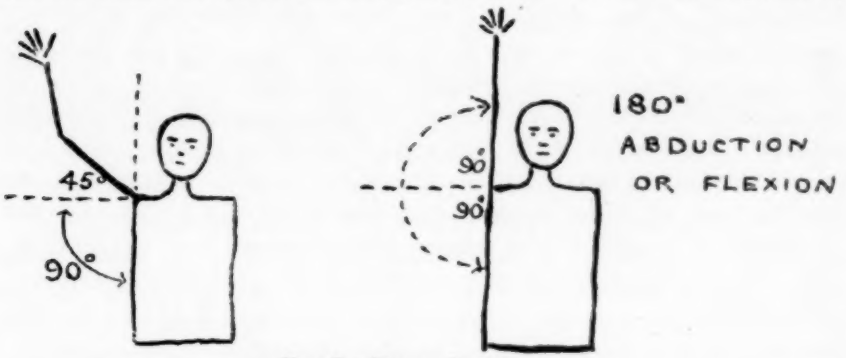


FIG. 7.—RIGHT SHOULDER.
These diagrams illustrate graphically the positions of 135° abduction at the shoulder and of vertical elevation at the shoulder joint, which may be 180° abduction or flexion.

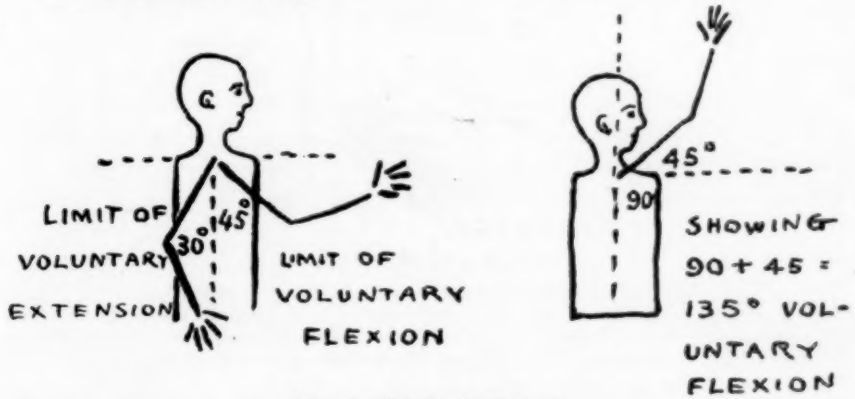


FIG. 8.—RIGHT SHOULDER.
These diagrams illustrate graphically 45° and 135° flexion of the shoulder joint and 30° extension of the shoulder.

In determining relations at the shoulder it must be remembered, or may be assumed, that the neutral position is one where the forearm, with the elbow flexed, points directly forward. A line through the condyles of the humerus at the same time, would run approximately from one side to the other. The condition of lessened external rotation at the shoulder joint is extremely important in cases where one suspects shortening of the tendon of the subscapularis or weakness of the external rotators. Graphic records for shoulder rotation will be considered in a later paper.

The question of records for movements of the lower limbs must be reserved for a subsequent article, but the writer cannot refrain from noting the confusion arising from the use of the terms "flexion" and "extension" at the ankle. The two terms are continually being misused and often one is in doubt about the accuracy of a given record for this reason. The terms "dorsiflexion" and "plantar flexion" are much preferable to "flexion" and "extension" from the standpoint of intelligibility. The custom at the Clinic for Functional Re-Education is to regard the neutral position of the foot as one where it is at right angles with the leg. Thus, for example, 30° dorsiflexion and 45° plantar flexion would be measured up and down from the position of right angulation. Here again a simple diagram aids in the avoidance of errors of interpretation.

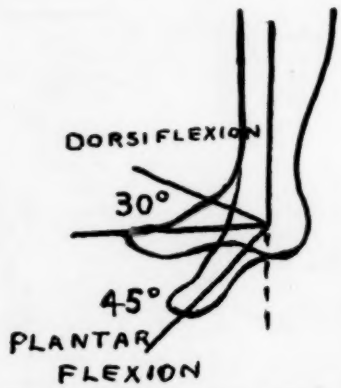


FIG. 9.—FOOT, SHOWING LIMIT OF DORSIFLEXION.
Foot showing limit of dorsiflexion (30° above the neutral position of right angulation) and of plantar flexion (45° below neutral position). This is not meant to indicate the limits of physiological motion in these directions.

The question of lateral movements of the foot is an involved one and must be left to a subsequent paper.

The writer, however, sums up his plea as follows:

1. Records of joint motion and deformity are as a rule unintelligible to the extreme.

2. They should be absolutely intelligible, as they are all-important in the treatment of the extremities.

3. Positions from which measurements are to be taken should be standardized.

4. Greater use should be made of graphic records, in the interest of intelligibility. Diagrams will make plain what we mean, even though we differ in our terms.

CASE RECORDING IN SPINAL CURVES.

BY EDWARD H. BRADFORD, M.D., BOSTON, MASS.

THAT there is a need of accurate records in observing cases of curvature of the spine is evident. No rational theory of treatment can be formulated unless based upon a foundation of positive facts and not upon conjecture, nor can a reliable prognosis be made unless based upon an experience with definite data.

It is for this reason that many methods have been employed to note the deformities of the trunk following curvature of the spine.

The most readily available method is by the photograph. But although there is no doubt that this method is useful, it is difficult to make it as accurate as is desirable. This is certainly true of round shoulder and antero-posterior deformities, in photographs of which the true character of the spinal and trunk outlines, lateral and pectoral, are masked by the projection of the shoulder blades, fat and muscle, but also in side curves with twists, in which contour defects may be masked by variations in lighting and shadow as well as in plate development and printing.

The skiagram is even less reliable, not only from the technical difficulties in accurate roentgenology, but because, owing to the difference in the ossification of growing bone and in the radiability of cartilage and of the thinner layers of young bone, the progress in curves at intervals of several months of growth cannot, by this method, be accurately estimated.

The elaborate devices for tracing contour; the hat measuring and pantogram appliances are unfitted for the ordinary use of practitioners.

Simplicity is an essential requisite provided it is not obtained with a sacrifice of accuracy. Anyone in charge of a large clinic and needing to rely upon assistants, will prefer to use simple methods if possible for his records.

The notes to be kept in antero-posterior curves differ from those needed in scoliosis, but in both it is essential to note the line of the spine, its flexibility or abnormal stiffness, as a measure of the skeletal deformity of the trunk.

It is of much use to note the variations in side flexibility of the spinal column in lateral curves. Abnormal limitation in any direction indicates abnormalities in bone structures, or in the shape of intervertebral discs, in the elasticity or length of intervertebral ligaments.

A simple method of recording this was suggested by Dr. E. G. Brackett. The lines of the spine are marked by a skin pencil. With the

FIG. I.—Tracing.—Side view.

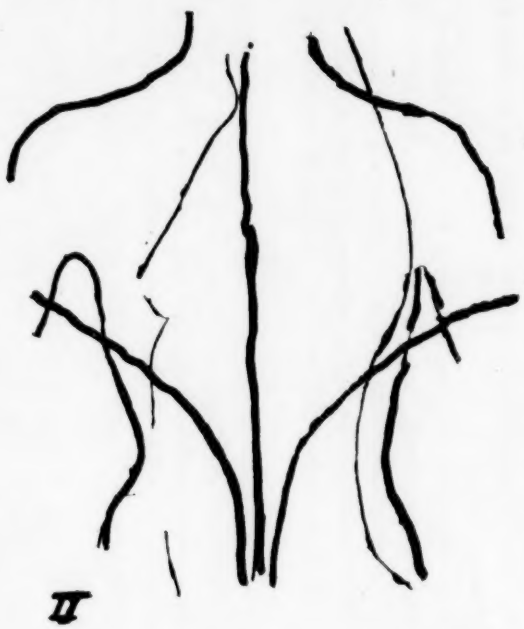


FIG. II.—Back view,—Normal lateral flexibility.

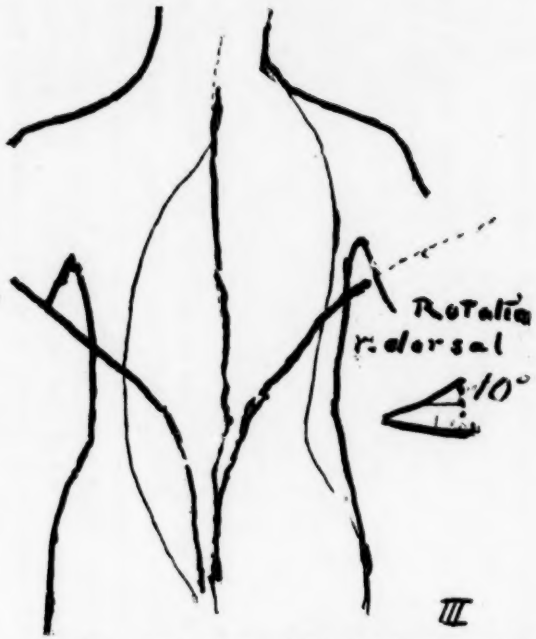


FIG. III.—Back view.—Limited lateral flexibility on the right side. Case of slight scoliosis in a rapidly growing child of fourteen. Right dorsal rotation ten degrees.

pelvis fixed, the patient is directed to bend to each side as far as possible, keeping the shoulders (*i.e.*, the upper part of the trunk) on the same plane as the cross axis of the pelvis; a straight line is then drawn on the skin, connecting the ends of the skin marks, with the patient bent first to one and then the other side, and the distances between the outer and the median lines noted with the patient in the erect posture. In this way, variations of the spinal lines in flexibility from the median position in extreme side motion to either side are noted. Some skill is required to draw the lines with accuracy.

The plan of covering the surface of the back along the spinal line with a strip of adhesive plaster closely and smoothly applied and marking the vertebral spines upon the cloth surface of the plaster has been made use of in records and can serve as a useful means of comparison except in the more pronounced distorted backs.

Attaching to the vertebral prominences by means of a strip of adhesive plaster a string with a weight at the end, making a plumb line, and noting the variation of the spinal line from this plumb line, furnishes a simple method which can be made of service.

Viewing the back through a frame holding a sheet of transparent celluloid and marking on the surface of the celluloid the spinal lines, gives a method of convenient record where the back can be placed in close contact with the celluloid plate, and the marks can easily be transferred to the paper to be filed with the other notes of the case.

These methods, though simple and sufficiently accurate for ready use, are insufficient to record the desired facts of the curves in round shoulders or the amount of rotation in scoliosis. A satisfactory, simple, and inexpensive method for recording rotation in scoliosis is not easily found.

A small pendulum arrangement has been suggested and used. It is easily made:—a flat bar slightly curved upward at the middle so as to permit the bar to be placed upon the recumbent back is armed with an upright projecting from its middle, to which a short pendulum is attached. The variations of the pendulum as it swings according to the slope of the cross plane of the back of the recumbent trunk can be noted if a scaled plate is secured behind the swing of the pendulum. An attached spirit level marks normal symmetry in contour of any cross section of the back as the patient lies flat on an unyielding surface.

This simple mechanism is faulty chiefly on account of its delicacy, the pendulum oscillating with the breathing of the patient. Some care

is necessary to eliminate these variations and determine the exact point of inclination to be noted.

A less delicate record and one, therefore, more adapted to ordinary use, can be made by a simple form of a quadrant. A scale marked device, somewhat resembling a quadrant but differing, however, in that the moving arm moves up and down instead of as a pendulum.

If the side of the quadrant is placed transversely across the back, the index arm raised to a level indicates on the scale the degree of the rib rotation at that portion of the trunk. As the scale is large, the markings are easily read. The level of the recording arm can be adjusted by the use of a small pendulum hanging from the index arm.

This device has an advantage, through its coarser adjustment, of more ready use over the spirit level arrangement just mentioned. The method often recommended of tracing the lines of the back placed close to a glass plate with the pelvis secured, has many advantages if employed in a simple form. It requires, however, a diopter to secure accuracy. If the eye looks obliquely or at different angles at the sides of the trunk or the slope of the shoulder or hips, the tracings will vary and lose accuracy. A simple and easily-made diopter is furnished by piercing a small cube of metal or wood, easily moved by the hand and kept flat on the plate glass surface, and inserting a small brass tube, large enough and not too large to be looked through on, to the point of a pencil placed obliquely in the block and adjusted to mark on the glass.

Glass marking pencils, obtainable at stationers, make a sufficiently clear mark. A darker and more readily made mark is made by the eye-brow pencil of the actor. These, however, are so soft that they are soon worn and quickly need replenishing. Still darker marking can be made by using instead of the pencil a small water-color brush dipped in black paint.

The patient should be seated or stand with the back as near as possible to a plate of transparent glass, in a well-lighted room with a white screen or light contrasting surface in front. The pelvis is sufficiently secured if the patient straddles a chair or sits squarely on a stool, or if standing, with the feet somewhat apart and the anterior superior spines held firmly against the back of a properly placed chair back, on which the hands can also be placed with the arms spread from the sides of the trunk.

The patient places herself in a less unnatural and rigid position in this way than if more firmly secured, and this furnishes a more satisfactory position for a record, and the recorder can easily notice and

correct any undesirable sitting or standing attitude and observe if the plane of the shoulders and pelvis is not parallel with that of the glass plate.

The lines of the shoulders, trunk and hips can be readily and accurately traced and marked on the glass by means of the pencil-armed diopter,—and also the tips of the scapulae and the marked lines of the spines of the vertebrae with the patient standing straight or bent to either side, care being taken that the side motions are made without twisting the plane of the shoulders and pelvis away from the plane of the glass.

Tracings on tissue paper taken from the lines marked upon the glass serve as permanent records and can be folded and kept compactly with other notes of the case.

It is evident that the glass plate must be firmly fixed on a suitable stand. This is easily arranged by placing a piece of window glass of desired size in an unbacked picture or mirror frame and securing this on a suitable stand.

If a number of cases are recorded by the above mentioned methods and the tracings examined, facts of interest will be noted, especially in regard to the variations in the side flexibility of the line of the vertebral spinous processes, both in normal cases and in those with pathological curves. In many instances without curves the side flexibility to the right will be found greater than to the left and the centers of greatest side flexibility will vary considerably as to their localization in the vertebral column. This, in some instances, is probably due to osseous or cartilaginous anatomical idiosyncrasies and in others the results of ligament adaptations to acquired habits of attitude or movement. These lines of curves furnish useful records, both of an abnormal condition of spinal mobility or of changes under treatment or observation, and may serve as a useful diagnostic symptom of early structural change not yet apparent to the eye.

The tracings of the side view of the spinal column and thorax are also of much value to enable the surgeon to note the changes, during growth or under treatment, of the osseous structure independent of attitudinal changes in the position of the scapulae.

These are readily made by means of a tracing rod bent at the end so as to pass along the line of the spine of a patient standing side ways; the other end of the tracing rod is furnished with a pencil bearing plate at right angles to it moved along a flat surface. This enables a marking to be made on paper placed upon the flat surface (*i.e.*, a wall

or flat door). This marking traces the line of the back as the rod moves down the spinal line and does not record the projecting shoulder blades. A tracing of the sternum and front line can also be made in the same way, thus giving a side cross section tracing of the trunk.

MESIAL TRI-PRISM.

BY WILLIAM JACKSON MERRILL, A.B., M.D., CAPTAIN, M.C., U.S.A., PHILADELPHIA, PA.

It will be seen by the accompanying cuts that the principle of this support placed between the soles of the shoe consists of three prisms, one running forward, the second running backward, from the mid-transverse line 3 (Fig. 4). The third prism, formed by the first and second, extends from the mesial side outward (Fig. 3). The outer edge of the tri-prism should be inward to the mesial side of the fifth metatarsal bone and not under it. The thin edge may extend slightly under the fifth metatarsal bone but not under its head. Placed in this manner the triprism does not raise up the distal head of the fifth metatarsal bone. Any device that extends completely across the sole of the shoe just back of the heads of the metatarsal bones and is held insecurely by the flexible sole, will, in the first place, cock up the distal end of the fifth metatarsal bone and strain the metatarso-phalangeal joint, and in the second place tend to abduct the forefoot. Such a device, especially when it is not stabilized with the heel of the shoe, will add mechanical factors which increase foot strain and disability.

In weight bearing the supporting points of the foot are, the tuberosity of the os calcis, the tuberosity of the fifth metatarsal bone and the distal heads of the five metatarsal bones. Normally in weight bearing the fifth metatarsal bone should be in normal alignment with the cuboid, os calcis, and its phalanges and parallel with the ground or its supporting structure, the shoe. If the average height heel be used and some device be placed under the distal head of the fifth metatarsal bone to raise it disproportionately with its proximal end, strain will

be applied to the metatarso-phalangeal joint, which is not only acutely painful but may produce a traumatic arthritis of that joint; consequently it is rational to so construct the sole of the shoe that the line from the heel to the toe shall agree with the normal alignment of the outer structures of the foot.

By using under the heads of the first four metatarsal bones, a wedge stabilized with the heel of the shoe, flattening of the feet, pronation of the feet, valgus of the foot and torsion of the tarsus may be corrected without applying straining forces to the outer structures of the foot.

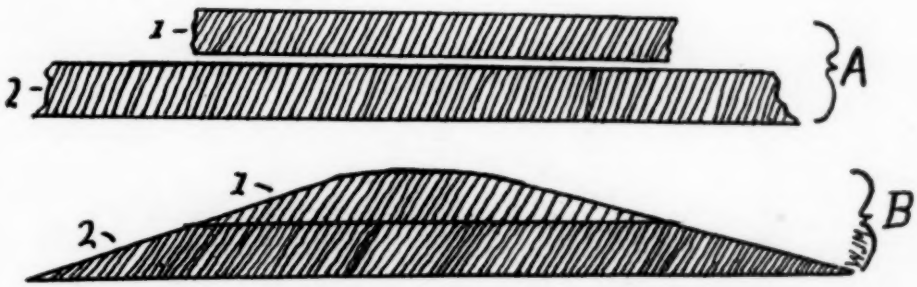


FIG. 1.—Strips of sole leather (A) 1—,2″ to 2½″ and 2—,3″ to 4″ in width are cemented together. These strips may be of any length. After being cemented together they may be skived—as (*B*) cross section—and from this strip triprisms of the desired size may be cut. The strip 1-*A* may be rubber to prevent squeaking.

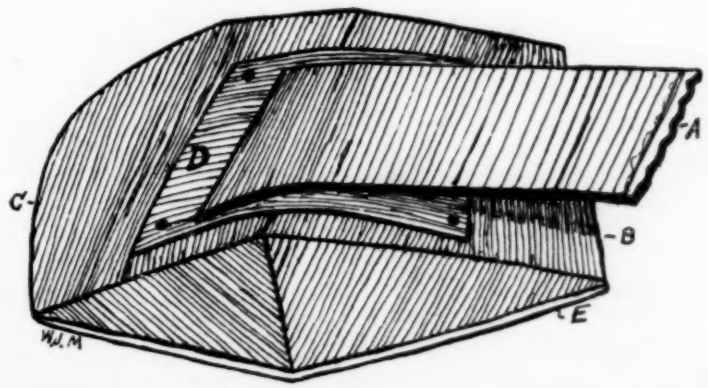


FIG. 2.—*A*, shank— anterior end bent to form curve upward; *B*, posterior edge of posterior prism; *C*, anterior edge of anterior prism; *D*, thin steel plate to prevent shank from cutting through leather; *E*, rubber to prevent squeaking.

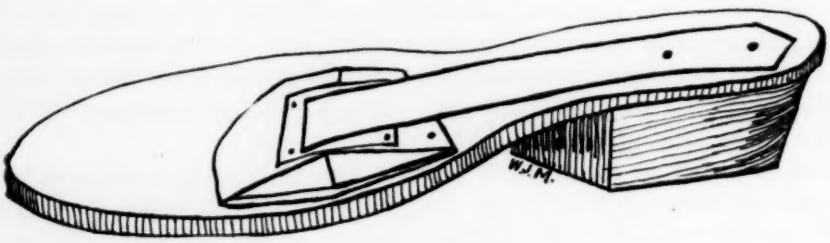


FIG. 3.—Shows the placing of triprism and the steel shank.

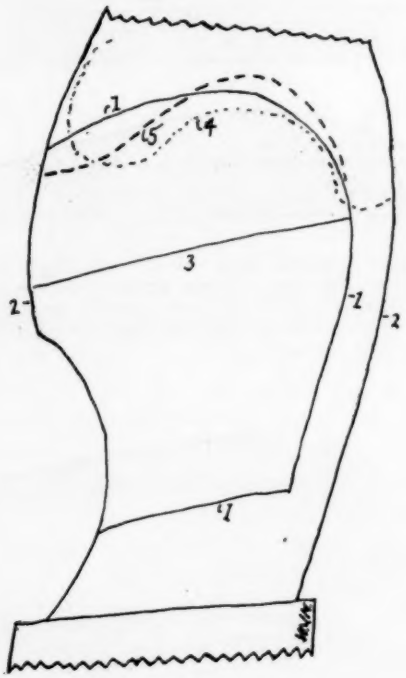


FIG. 4.—Outline drawing of triprism, showing its limit laterally and the possible variations of the anterior edge: 1 (————), the usual form; 5 (-----) to extend under the 2nd, 3rd, and 4th metatarsal heads, and 4 (.....) to form a depression for the ball of the great toe. The prism may extend backward to any desired point. The anterior limit of the prism is determined by putting the shoe on the foot, finding the joint lines of the 1st and 5th metatarso-phalangeal joint, marking three points on the sole of the shoe. Draw a line between these points and curve the anterior edge of the triprism as indicated. The anterior thickness should be made to suit the given case.

The author has used this device in the treatment of a number of cases in which the conditions just named have existed, and when the appliance has been properly adjusted relief has been obtained. It has been especially satisfactory in the treatment of cases of torsion of the tarsus in which the distressing symptom, metatarsalgia, existed.

It has also, as an adjunct to physio-therapy, given good results in the treatment of flaccid flat feet. The author had acute foot strain as a result of torsion of the tarsus, producing intense metatarsalgia and tarsalgia, which was relieved by this device.

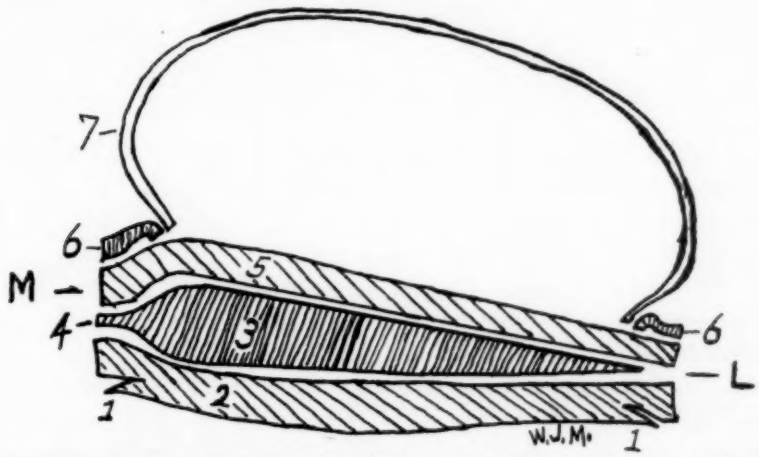


FIG. 5.—To indicate cross section in triprism at 3 (Fig. 4). 7, upper; 6 welt; 5, inner sole; 4, mesial edge skived down to be stitched between soles; 3, cross section of tri-prism at thickest point; 2, top sole; 1, channel for stitching; *M*, mesial, and *L*, lateral sides.

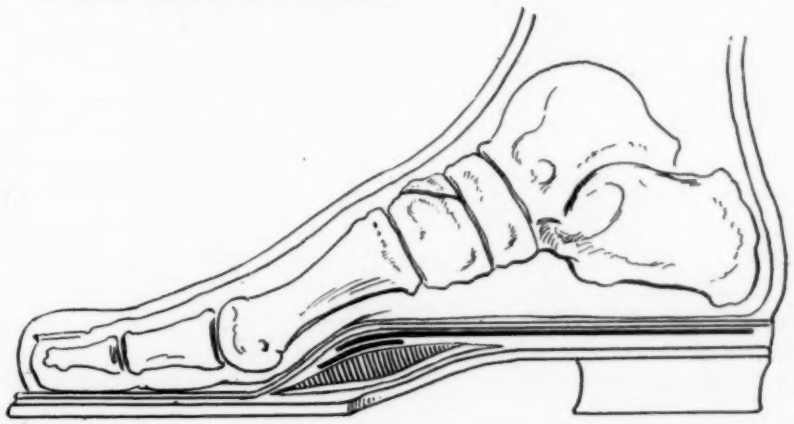


FIG. 6.—To indicate where the pressure should be made under the ball of the foot.

Every orthopædic surgeon who has had considerable experience in the treatment of foot disorders understands that any device, whether it be a shoe or some appliance combined with a shoe, plays a very small rôle in the treatment and is only temporary. He should at least understand the importance of constitutional measures as well as local, the latter consisting of massage, exercises, correct posture, indicated applications, etc.

As a rule a loose support in the shoe, such as arches, plates, pads, etc., does not accomplish the object of its use, chiefly because it is an unstable, shifting device and does not form a secure foundation for the foot. All supports, arches, etc., worn in the shoe abduct the forefoot. When a support is needed it is much more efficient when so fixed to the shoe that it will not shift or roll under the foot in weight bearing.

The practice of placing a mesial wedge under the first metatarsophalangeal joint is an infraction of fundamental mechanical principles. In certain cases of arthritis, excessive pronation, extreme weakness and flaccidity, a long mesial wedge from tip of heel to toe, being thicker under the heel than under the ball of the foot, is a rational measure.

Whatever type of support is used to supinate the tarsal structures, it should have a stiff shank to stabilize it with the heel, because in the first place the anterior device will roll and twist independently of the heel and apply torsion stress to the foot, and in the second place, especially with a weak foot, the mid-tarsus will buckle, raising the distal heads of the metatarsal bones disproportionately.

By a stiff shank is meant a shank constructed of steel of moderate temper, of No. 16 to No. 19 gauge, depending upon the weight of the person and the temper of the steel, and broad enough to sustain the weight applied to it without bending and altering in shape. When spring steel is used the temper should be such that the shank will return to its designed shape after the weight of the body has been applied to it. In any case the temper of the shank should be such that it will be possible to change its shape at will. Number sixteen sheet spring steel will serve the purpose. This feature is of great importance because it will be found in certain cases that it is necessary to raise the distal end of the pad and in other cases the mid portion, disproportionately. This can be done to suit the needs of the case by using a hollow block and a round-faced rawhide mallet. The moulding feature will be found valuable because in most individual cases the shape of the support must be changed from time to time.

A SIMPLE SPLINT FOR THE TREATMENT OF FRACTURES OF THE CLAVICLE.

BY RUSSELL L. HODGE, CAPTAIN, M.C., BASE HOSPITAL 28, A.P.O. 753.

WHEN the clavicle is fractured a characteristic deformity presents. The shoulder drops downwards, inwards, and forwards. The deformity is easily reduced, but to keep it reduced, without too great inconvenience to the patient, is extremely difficult. If the patient could be kept lying on his back on a hard mattress with a long, narrow, firm pillow along his dorsal spine between the scapulae, gravity acting through the shoulders would reduce the fracture and maintain the reductions. No normal human being would submit to this treatment, but the principles of the treatment can be fulfilled by using a T shaped splint in place of the mattress and pillow, and by substituting properly placed straps for gravity.

The Splint. Take two pieces of wood 2¾ inches wide and ¼ inch thick and nail them together so as to make a T (Fig. 1). The longi-

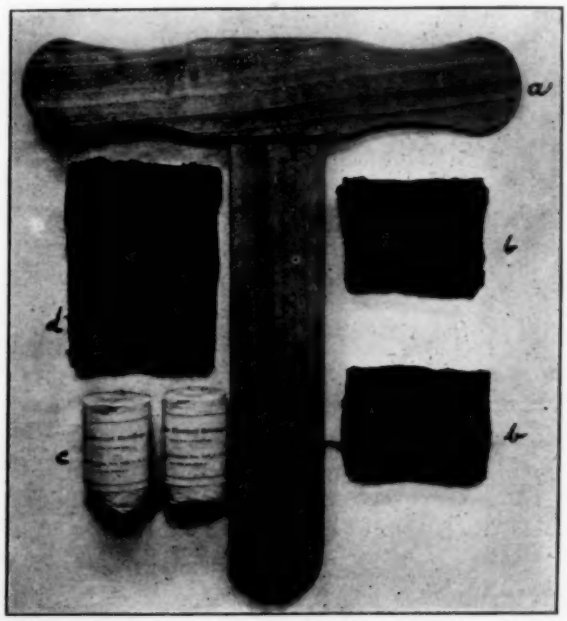


FIG. 1.—*a*, The splint; *b*, axillary pads; *c*, bandages; *d*, dorsal pad.

FIG. 2.—Splint being applied. Dorsal pad being inserted.

FIG. 3.—Splint applied. Back view.

tudinal part or stem of the T is 23 inches long. The transverse part or cross of the T is 20 inches long and its upper edge is hollowed out to a depth of about one-half inch for three inches near its two extremities. This hollowing permits the easy and secure application of a bandage.

Application. Pad the splint thoroughly. Place the splint on the back of the patient in such a manner that the cross piece rests as high as possible along and above the superior borders of the scapulae, while the stem extends almost vertically from the body.

Place a felt pad 4x6 inches in size over each axilla so as to protect the axillary vessels and nerves. Fix the cross piece of the splint snugly to the shoulders by means of a figure of eight bandage of canton flannel four inches wide. The hollowing of the cross piece prevents the bandage from slipping; the felt pads protect the axillae from pressure.

Push a piece of felt, 6x8 inches in size, between the splint and the cervical spine. Note that the stem of the cross projects backwards from the body like a lever (Fig. 2). Push the stem of the cross down against the dorsal spine and fix it in position by a bandage surrounding the body (Fig. 3). The stem of the splint thus acts as a lever pulling the shoulders backwards and upwards (the cross piece having been placed high up). Outward traction on the shoulder is obtained

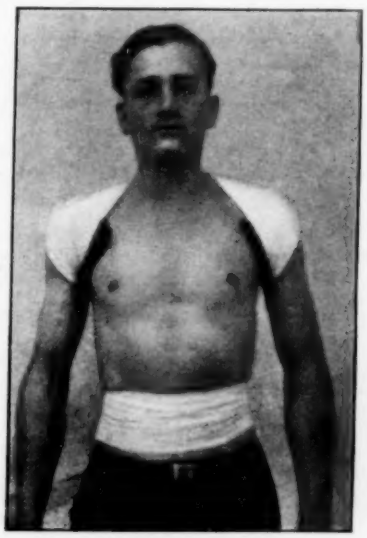


FIG. 4.—Splint applied. Front view.

by the figure of eight bandage covering the felt pads in the axilla (Fig. 4).

1 The splint is suitable for both bilateral and unilateral fractures.

2 The application of the splint reduces the fracture painlessly.

3 The arms are left free and thus muscular atrophy is avoided.

4 The patient can use the arm on the injured side for any ordinary purposes, such as writing, feeding himself, etc.

5 Accurate apposition of the fragments of the bone is obtained.

6 Open wounds are easily accessible for treatment without disturbing the apparatus.

Orthopaedic Society Meeting.

BRITISH ORTHOPÆDIC ASSOCIATION.

SPECIAL MEETING, MAY 30 AND 31, 1919, LIVERPOOL.

PROGRAMME.

Friday, May 30th.

At the Liverpool Medical Institution, Mount Pleasant, Liverpool.

10 A.M. Executive proceedings.

10.30 A.M. Discussion on "The Treatment of Flail Joints of the Upper Limb, Following Gunshot Injuries." Opened by MR. NAUGHTON DUNN and MR. HARRY PLATT.

12 A.M. "The Anatomy of Snapping Hip." Professor F. WOOD JONES (by invitation).

Demonstration of radiograms of a case of tuberculosis of one hip joint associated with congenital dislocation of the opposite hip. MR. A. ROCYN JONES.

1 P.M. Luncheon.

2.15 P.M. Two Cases of Unusual Accidents to Amputation Stumps. MR. E. MUIRHEAD LITTLE.

Some Speculations on the Functions of Scar Tissue. MR. D. MCCRAE AITKEN.

Observations on the Treatment of Static Disabilities of the Feet. MR. W. H. TRETHOWAN.

On the Operative Treatment of Paralytic Talipes Calcaneo-cavo-valgus. MR. NAUGHTON DUNN.

7.30 P.M. Dinner. Adelphi Hotel.

Saturday, May 31st.

At Alder Hey Special Military Surgical Hospital.

10 A.M. Demonstration of Patients and Operations. MR. T. R. W. ARMOUR, MR. T. P. MCMURRAY, and other members of the hospital staff.

2 P.M. Visit to the Children's Country Hospital, Leasowe, with MR. T. R. W. ARMOUR.

Visit to the Liverpool Country Hospital for Children, Heswall-on-Dee, with MR. T. P. MCMURRAY.

Book Reviews

Functional Prosthesis of the War Wounded. DUCROQUET. Paris, Masson et Cie, 1919.

In this little book the mechanics of supporting braces is presented in great detail. Extreme care has been given to the proper axis for the joints, which is made in each location to conform to that of the normal limb. The centering of the axis has been made the subject of experiments on the cadaver and on the living. The center for the metatarsophalangeal joint is found to pass through the heads of the first and fifth metatarsals. The center for the ankle corresponds approximately to the axis of the cylindrical portion of the astragalus, passing just beneath the inner malleolus, and is therefore oblique backward and outward. The axis of the knee centers through the femoral condyles at the level of the upper insertions of the lateral and the crucial ligaments, three quarters posterior. The axis flexion of the hip passes through the femoral axis of the knee centers through the femoral condyles at the level of the upper insertions of the lateral and the crucial ligaments, three quarters posterior. The axis of flexion of the hip passes through the femoral heads at which level the joint of the apparatus should be placed. Here we have also two other types of motion to consider: abduction-adduction and rotation. The abduction is provided for by a second joint in the apparatus immediately below the flexion joint and in plane at right angles to it. The elbow has only one motion, for all practical purposes, the axis of which corresponds to the center of the epitrochlea. Of the three motions of the shoulder (flexion, abduction and rotation), the last is disregarded and the apparatus is fitted with two joints, one above the other and at right angles to each other, to provide for the flexion and abduction.

A chapter is devoted to splints for immobilization and braces with joints to support members in motion. Emphasis is laid on the points of support. For example, in case of a splint for holding the knee in extension the two points of support are the gluteal mass and the heel, and the point of counter pressure is the front of the patella. Any splint not extending to these two points of support falls short of its purpose.

Another chapter deals in a comprehensive manner with modifications of shoes for correction of foot deformities or for improvement, either cosmetic or functional, of a foot with an incorrectible deformity. A cinematic study of normal gait compared with that of patients with shortening of one leg, ankylosis of the ankle or knee and other deformities of the lower limbs, furnishes three interesting chapters.

Pseudarthrosis of the bones of the lower limbs is sometimes curable by proper supporting apparatus. Its occurrence is most frequent in

the lower leg, is rarely seen in the neck of the femur and practically never in the femoral shaft. For a pseudarthrosis of the middle or lower third of the tibia a molded leather or celluloid reinforced brace, lacing in front extending to the knee is recommended. This brace includes the foot and has an ankle joint if the fracture is in the middle third. If in the lower third no ankle joint is provided. A similar apparatus serves for an upper third pseudarthrosis, but here it is extended up on the thigh and is provided with a knee joint as well as an ankle joint. The author states that he has had consolidation in delayed unions of more than a year's standing with such an apparatus. Pseudarthrosis of the radius is more frequent than that of the ulna. In the elbow it may be of the flail type or of a less movable type. The former is much more common. The condition may be ameliorated by a brace extending from a shoulder cap to the wrist with a joint at the elbow which allows flexion and extension only. Complicating a pseudarthrosis of the humerus one may encounter an ankylosis of the elbow or of the shoulder, destruction of the flexor muscles of the elbow or a paralysis of the radial nerve. Several varieties of braces for false joint in the humerus are described. The simplest is a molded leather one with shoulder cap, with lacing and without joints. This holds the two fragments in line. Some of the more complicated forms have joints either at the shoulder or the elbow or both, depending upon the location of the lesion or the muscle complications.

One is inclined to wonder, however, why any sort of supporting apparatus should be used for these pseudarthroses when it would be possible in most cases to do away entirely with the lesion by an operation for inserting a bone graft.

Methods of examining various muscles of the upper and lower limbs by palpation to determine whether or not they are active, are described in detail. This chapter is followed by one on paralyses due to lesion of various nerves and the apparatus for support and relief of tension on the affected muscles.

Contractures of muscles and tendons of the lower limbs producing, for example, pes equinus and pes varus are best treated by operations, especially after they have existed for over a year. Medio-tarsal and subastragaloid arthrodesis is recommended for equino-varus of long standing—*William Arthur Clark.*

A Treatise on Orthopedic Surgery. By ROYAL WHITMAN, M.D. Sixth Edition. Lea and Febiger, Philadelphia and New York. 1919.

The appearance of this excellent book in its sixth edition proves anew its value as well as the growing interest in orthopedic surgery. The author's aim has been, as he says in the preface, to emphasize the constant purpose of orthopedic surgery to prevent or to correct deformity and to preserve or to restore function, a purpose that governs

treatment from the beginning to the end. In striving toward this aim the author still clings to the old conception of orthopedic surgery, yet throughout the whole book one notices a refreshing breeze of progressive modern spirit. The objection may be raised that the book does not entirely and sufficiently cover all the subjects which come under the care of a present day orthopedic clinic, especially as concerns adult cases. However, as the borderlines of orthopedics are so manifold and so different in different clinics, certain restrictions have to be made, and on the whole we feel that the author has displayed great wisdom in the making of these restrictions, though we would like to have the scope of certain subjects, such as faulty posture, somewhat extended.

The great advantages of the former editions, clear, logical diction, scientific spirit, and sound conservative judgment are also noted in the new edition as well as in the chapter on Military Orthopedic Surgery which is added to the book. In this chapter the rules of the selective service governing orthopedic disabilities are given in detail. Then follows a description of other appliances of approved value as well as certain operative methods in war fractures. Artificial limbs and kineto-plastic amputations are considered next. The surgical treatment of peripheral nerve injuries is dealt with in some detail, covering most of the important nerves and describing methods of transplantation for hopeless injuries of the median nerve and others. The student is informed about the proper attitude of election in case a joint is expected to become stiff. Early exercise and massage in infected joint wounds is mentioned with a certain conservative restriction and the chapter is concluded with short remarks on reconstructive treatment.

The contents of this chapter show how much the field of orthopedic surgery has been enlarged by the experiences of the war. It will take time before these experiences can be sufficiently amalgamated with the original scope of orthopedics, but this, in my opinion, will come, and we are satisfied with the hopeful beginning expressed in this valuable addition of Whitman's book.

Current Orthopaedic Literature

Numerals at head of each abstract are for use in connection with the official "Classification of Orthopædic Literature," published in the JOURNAL for January, 1917, reprints of which are obtainable from the JOURNAL office.

III. ORTHOPÆDIC OPERATIVE, POST OPERATIVE AND ADJUVANT TECHNIC.

III, 1.

THE CLOSURE OF CAVITIES IN BONE. Lieut-Col. Perry Sargent, D.S.O. *Journal of the Royal Army Medical Corps.* February, 1919.

The periodic curetting of a sinus leading into bone is a practice which merely illustrates the triumph of hope over experience.

The processes of repair in bone differ in no fundamental respect from those which occur in other vascular tissues, but they are modified by its peculiar and complex structure. Bones vary in their vascularity according to their density and so we find cancellous bone more adapted for recovery than compact bone, and young bones than old. The denser the bone the more readily does necrosis occur; the less easily do sequestra separate, and the more slowly is healing effected.

In order that a cavity may become obliterated, and firmly and finally healed, its walls must be approximated until the granulations which cover them are able to coalesce.

No tourniquet is employed. The use of a tourniquet certainly renders certain stages of the operation more easy, but the subsequent oozing is a great drawback. Haemorrhage is easily kept under control by the frequent application of large pieces of gauze wrung out in very hot saline. As a rule, the operative field can be kept dry by this means. Further, it is easier to judge of the condition of a bone which bleeds under the curette than one which is temporarily deprived of its blood supply. Again, as these operations consume a considerable amount of time, the total deprivation of blood for an hour or more of skin whose nutrition is already impaired by scarring, may result in subsequent sloughing.

One of the most essential points in the operation is to secure a sufficiently thorough exposure of bone both above and below the site of the cavity which is to be attacked. The surgeon must see exactly what he is doing in every part of the operative field, and not trust to the curette for discovering hidden recesses.

The author usually begins by a fairly wide excision of the wall of the sinus, which leads down to the bony cavity. When more than one sinus exists, he selects the one which is most conveniently situated, and which gives the easiest and most direct access to the bone, having regard to the anatomy of the structures in the neighborhood. Any other sinuses may or may not be dealt with according to their situation and the density of their walls.

The periosteum is next incised, to the extent of the whole length of the wound, and stripped from the bone so as to bare it completely—not only at the actual site of the cavity, but for some distance both above and below.

At this stage it is convenient to employ Lane's bone levers instead of the ordinary retractor, so as to bring the bone into prominence by depressing the soft parts. They are inserted between the periosteum and the bone.

Before attacking the bone, it is necessary to pack it off by means of gauze pads, partly to prevent soiling of the wound generally, but particularly to prevent fragments of bone getting lost among the soft parts and being accidentally left behind. This is most important, more than one of the failures being due to the leaving behind of bone chips.

That part of the operation which consists in preparing the cavity for the graft is entirely sub-periosteal.

The bone so exposed can be thoroughly examined and a decision made as to which wall of the cavity can best be spared from the point of view of strength of bone. Other things being equal, that aspect of the bone is selected for removal which is most conveniently related to such overlying muscles as can best be employed by filling the cavity.

These points being decided, the cavity in the bone is fully opened up by means of a chisel and mallet, until every part of it can be thoroughly explored. All granulation tissue and dead or carious bone must be removed and all recesses followed up and cleansed. The cavity is next washed out with hot saline solution, and plugged tightly with gauze. This completes the first stage of the operation.

The second stage is not commenced until all soiled packing has been removed, the towels changed, the instruments re-sterilized and the surgeon's and assistant's gloves have been changed. From this point onwards, the operation must be regarded as an aseptic procedure. The wound, of course, is not free from bacteria, but their number has been so reduced that the tissues can deal with the remainder.

The actual method of filling the cavity with muscle is different in every case: what one must do is to fashion from the most conveniently situated mass of muscle a thick broad-pedicled flap of approximately the same size as the cavity. It is a plastic operation based on the same principles as those which govern plastic operations in general and the main point to be kept in mind is to secure an adequate blood supply to the transplanted muscle. The muscle graft is now pushed into the cavity and pressed home firmly; it readily adheres to the bone. A few stitches of catgut may be required to bring together the overlying muscles and to assist in keeping the graft in position. The skin is loosely sutured and the subsequent escape of exudate is provided for by means of rolls of rubber sheeting inserted in convenient parts of the wound. It is important to place one such drain in the space from which the muscle graft has been cut, as was pointed out by Captain Z. Mennel, who has had a large experience with the operation. These drains are usually removed at the end of forty-eight hours. The limb is splinted in such a way as to relax the parent muscle. *Leo C. Donnelly, Detroit.*

III, 3 and 7.

(Segmentary Bone Grafts in Military Surgery. Dr. Mauclaire. *Bull. de l' Académie de Médicine,* January 28, 1919.

Before proceeding to operate one should note carefully how much loss of substance is present and how much time has elapsed since the original injury.

No operation should be undertaken for some months after the wound has healed, and if sepsis was present, six months at least should elapse before bone grafting is done.

The author's favorite method is to make a pointed graft (no matter from what bone it is taken) and to introduce it in the medullary canal above and below. He lays particular stress on the necessity of not handling the graft even with the gloved hand.

A report of 128 cases with 72 successes he estimates too high a percentage; he feels that some of the non-successes were not reported; his own percentage was 7 cases out of 23; among the 23 cases there were some in whom the skin was very thin and invaded by a great deal of fibrous tissue.

He prefers the osteo-periosteal graft of Ollier, which was proven to be the most successful during the Russo-Japanese war and by M. Delagenière during the recent war.

He observed for two years an osteo-periosteal graft of the tibia where at the end of that time the graft was hypertrophied and union firm.

In another case observed for the same length of time a bone graft without the periosteum was found atrophied.

It is evident, then, that he prefers the graft with its covering of periosteum.—*Daniel LeFerté, Detroit.*

III, 7.

OSTEOPLASTIC SURGERY DURING THE WAR. Charbonnel. *Journal de Médicine de Bordeaux.* January 15, 1919, p. 8.

Constructive surgery of bone has grown more important during the war and there is no doubt that more surgeons practice it now than formerly. The impetus for this has been, first, the enormous number of fractures, and second, paradoxical as it may seem, that most of the fractures have been open ones. Up to the end of 1915 most surgeons hesitated to apply fixation of any kind to open wound fractures, but little by little the practice of wiring and plating became common, until at present, it is fairly well established that open fractures may, within the first twenty-four hours, be fixed by plate or wire until they are bacteriologically clean, when the wound may be closed. The technique of such operations should be none the less perfect on account of the existing infection, for it is not permissible to add one infection to another. Such an operation will preclude the displacement of fragments by muscular contraction. The means of coaptation should be very powerful and if screws are used they should be set as far as possible away from the seat of the fracture. One must not be in a hurry to remove the means of fixation in case of supervening suppuration. Conserve the soft parts, use Dakin's solution if need be, and when clean remove the plate or wire on doing the secondary suture of the wound.

Fourteen cases of primitive fixation by wire or plates are reported. Some of these had primary union, some secondary after sterilization with Dakin's solution.

For later cases, in which there has been complete esquillectomy and the infection has entirely gone, a bone graft should be done to fill in the defects where necessary. It is advisable to do a bone graft for forearm and leg where there are two bones, and to use metallic support for defects in single bones such as the humerus.

Pseudarthrosis and delayed union furnish a special field for osteosynthetic operations. The Lambotte plate is recommended by Villard and it is stated that it serves not only to immobilize the fragments but to furnish an irrita-

tion which acts as a stimulus to calcification. The author, however, is not entirely in accord with this method and can not reconcile it with the rarefication usually observed under metal plates screwed to the bone. Those cases consolidating after plating would probably do so without the plates, as many do after only irritation with or without curettage.

With the loss of substance of five centimeters or more, a total segment graft is advised. Some authors advocate fastening such a graft at each end with wire, but such a procedure defeats the purpose.—*William Arthur Clark, Chicago.*

III, 11.

SOME ERRORS AND PREJUDICES CONCERNING MECHANOTHERAPY. Sandoz. *Paris Médical,* February 1, 1919, p. 103.

Introduced into France about thirty years ago, mechanotherapy has only slowly gained the recognition of the medical profession. In the beginning of the war it aroused more interest to the extent that many came forward with systems new and untried with the result that the method as a whole suffered some discredit on account of poor and indifferent results obtained by inexperienced workers.

A mistaken idea held by many of the medical profession is that mechanotherapy consists in breaking up ankylosis by machines or whatever force is required. On the contrary, the method is, first of all, one of gentleness and patience, repudiating all maneuvers of force. Another error arising usually among masseurs, is that it replaces massage with a gross and brutal system. The answer to this is that it never has pretended to replace manual treatment entirely, although there are many cases in which mechanotherapy offers a distinct advantage in economy of time and in obviating fatigue.

The most insistent adversaries of the method are without doubt those who manifest an unlimited enthusiasm for manual exercises as a means of re-education. These views have had a wide influence on the public who are more or less ignorant of the real and comparative values of the different methods. Manual exercise, however, is only a complement to the methods of mechanotherapy.

To the question: what is mechanotherapy? the author replies by quoting Lagrange: "Mechanotherapy is only the employment of the mechanical means invented by Zander, for applying the system of medical gymnastics founded by Ling." This method of Ling, usually called the Swedish method, comprises both passive and active movements. Zander conceived the idea that many of these movements performed by hand might be done by machines. It might be said that mechanotherapy is a perfection of the methods of Ling, because a third factor, a combination of active and passive movements, is introduced and a very accurate means of graduating the exercise is provided by levers with adjustable weights.

A complete equipment consists of about sixty machines, of which about twenty are for passive exercises, a half dozen for activo-passive exercises and the rest active or corrective. The minimum is about forty. With less than that number one can not carry on unless liberally aided by hand work. The author makes a decided distinction between mechanotherapy and the methods of the so-called arthromotors which are wrong both physiologically and therapeutically.

Regarding the objections of the manual gymnasts the author admits that the human hand is better than a machine, but affirms that good results are obtained in shorter time and in greater numbers by mechanical methods.

It is also noted that the most competent of the manual gymnasts admit the possibility of good results by mechanical means.

Functional re-education by manual work should be undertaken only after all that can be has been accomplished by mechanotherapy.—*William Arthur Clark, Chicago.*

IX, 2.

IX. CONGENITAL DISLOCATIONS AND LUXATIONS.

THE USE OF CONTINUED EXTENSION BY MEANS OF A NEW EXTENSION FRAME IN THE BLOODLESS REDUCTION OF CONGENITAL DISLOCATION OF THE HIP. John W. Churchman. *Surg., Gyn., and Obst.*, May, 1919.

The modification of the Lorenz technique which the author brings forth aims to eliminate the risks, while adhering to the principles of the Lorenz technique; and to do this by substituting for the violent manipulations under anaesthesia a rather gradual extension.

A new extension frame has been devised to put extension on the leg in any desired position of abduction and at the same time to keep up any desired type of rotation.

With this extension frame the muscles may be stretched gradually to any desired degree and absolutely without pain; and the head of the femur may be gradually laid into the position desired, purely by the method of extension and rotation, or by these methods supplemented by the slightest possible manipulation of the head of the femur.

After the reduction of the dislocation, the case is treated exactly as indicated by Lorenz.

The extension frame used consisted of a 1¼ inch gas pipe bent into a circle. If abduction beyond a right angle was desired, or it was found that with abduction nearly at right angles, the child overcame this abduction by rising in bed, the extension frame was shifted to the head of the bed. In this position abduction to any desired degree could be obtained. For the production of rotation, straps were attached in the usual fashion and these were led to pulleys which could be attached at any point in the frame desired.

The method here described consists briefly in:

1. Application of extension in the lines of the legs as they rest in their deformed position.

2. Gradual abduction until the legs form with each other an angle of 180 degrees.

3. When maximum abduction has been produced, digital manipulation of the heads of the femurs to drop them into place.

4. Maintenance throughout of rotation necessary to keep the toes pointing directly upward.

5. Gradual reduction of the maximum abduction produced, until the legs form with each other an angle of about 35 degrees.

6. Application of plaster cast from the waist to the knees.

7. Transmission of the body weight to the acetabula, through the head of the femur, by allowing the child to walk.

If a favorable case in a young infant with well developed acetabula is treated in this way, not only will the case be simplified by eliminating the violent manipulations hitherto used, but more accurate results will probably

be obtained because it will be found that the head can in this way be placed at will exactly where one wishes it to lie, and that if the position is, by roentgenographs, shown to be not entirely satisfactory, a change in the direction of the extension or rotation straps will make the desired correction —*Leo C. Donnelly, Detroit.*

XII. CHRONIC INFECTIONS OF JOINTS AND BURSAE (non-traumatic).

XII, 2, *a*.

DEFORMING ARTHRITIS OF THE HIP IN THE ADULT. Beaujard, Roussy, Caillods, and Cornil. *Paris Médical*, February 22, 1919, p. 151.

In all cases of limping and anti-algesic attitudes in which the cause was not obvious the authors made systematic radiographic studies of the hip joint.

Subjects examined were between twenty-five and thirty years of age, without previous infection of the hip and without history of tuberculosis or syphilis. The symptoms usually followed fatigue in the field or rather rarely started with a fall. Because of the localization of the symptoms the patients usually came with a diagnosis of sciatica. The patient stands on the leg opposite the affected side and on walking holds the hip stiff and bears weight on it only for a very short interval. In one case an audible click, caused by subluxation of the head of the femur, accompanied the limp. Abduction and external rotation of the hip is quite usually sharply limited, adduction and internal rotation not so much so, and flexion only slightly limited. Crepitation in the joint is rarely felt in these movements. Percussion over the great trochanter reveals slight pain in the joint. In rare instances there was real shortening (as much as three centimeters in one case) on the affected side. Muscular atrophy was present in late cases and concordant with this, an exaggerated knee jerk. Hypertonicity with fibrillar contractions of the gluteal muscles is sometimes present.

Radiographic examinations lead to a classification of lesions causing the above symptoms.

Type I. Hypertrophy of the femoral head predominating on the superior-internal aspect. Two varieties of this type are distinguished. In one the angle and form of the neck is unchanged and in the other the neck is shortened and its direction approaches more toward the vertical, thus causing an increase in the angle with the shaft. The head in the second variety may be said to show an exaggeration of the hypertrophy which characterizes the first variety.

Type II. Generalized hypertrophy of the femoral head overhanging the neck on all sides, tending to produce a cuneiform or oval shape. Two varieties are described, which may be only two stages of the same process. Variety 1. Head elongated transversely, with a horizontal upper surface and a more or less vertical inner surface, neck shortened but still visible and at normal angle, acetabulum enlarged, the upper limits of head and acetabulum separated while the lower limits are in contact. Variety 2. Hypertrophy of head very marked, extending even to the trochanters, the neck overgrown by the head and scarcely visible, yet the angle of inclination preserved, acetabulum enlarged and receding from the head at the upper part.

From a diagnostic standpoint the condition studied seems to be distinct from other arthropathies. In coxa-vara the angle of the neck is diminished while in this condition it is either normal or increased. In coxalgia there

is irregular destruction of osseous tissue with decalcification and atrophy. It differs from the tabetic joint by the absence of fractures and from chronic ankylosing arthritis in the absence of osteophytes and presence of hypertrophy.

In classical works one does not find any description of a condition such as this. Recent French literature, however (Calvé and Lamy), furnishes something of a type of pseudo-coaxalgia which may be classed with it.

In regard to the etiology, first of all the question of trauma arises: whether the lesion comes from a mechanism similar to that causing coxa-vara, whether a repeated trauma is a factor or whether it results from an unbalanced attitude throwing the body out of plumb. Two obvious objections to this stand out: the deformity of the neck is often a coxa-valga and the age of the patients studied is well past that at which plastic changes in the bones occur. Is it an intermediate clinical form between morbus coxae juvenilis and morbus coxae senilis? Is it morbus coxae senilis praecox brought on by fatigues and hardships of life in the field? Verified answers can not be given to these questions.

The authors are describing a condition which is very similar to what American orthopedic surgeons are accustomed to call hypertrophic arthritis of the hip.—*William Arthur Clark, Chicago.*

XII, 3, and XIII, 2.

TONSILLECTOMY IN MYOSITIS AND ARTHRITIS. Results in two hundred cases. H. I. LITTLE, M.D., and H. R. LYONS, M. D. *Journal A. M. A.*, April 26, 1919.

The authors have formed their judgment from a series of cases operated upon for removal of tonsils at the Mayo Clinic. Replies from these 200 persons as to their condition were received during the year following operation.

The estimates of improvement or non-improvement are made from several different viewpoints with fairness and frankness. The operators have acknowledged failures and successes with equal cheerfulness.

Their summary which follows cannot be improved.

SUMMARY.

1. It is justifiable to advise a tonsillectomy in every frank case of myositis or arthritis.

2. A marked improvement may be assured from tonsillectomy alone in 79 per cent. of all cases.

3. It is necessary to remove all possibility of dental sepsis; by so doing a large percentage of patients will be improved.

4. The duration of the myositis or arthritis is a factor in the ultimate results, although benefit and even complete cure is obtained in some long standing, chronic cases.

5. Forty per cent. of the patients with chronic myositis or arthritis who are invalids will respond favorably to tonsillectomy.

6. The size of a tonsil has no bearing on its possibility as a focus of infection. A careful expression of the tonsillar crypts and a history of throat trouble associated or not associated with the myositis or arthritis is essential in the diagnosis.

7. An absence of a history of diseased tonsil in no way eliminates the organ as a focus of infection.

8. A clean tonsillectomy, with the removal of the plica tonsillaris, is necessary in every case.—*H. A. Pingree, Portland, Maine.*

XII, 7.

DERANGEMENTS OF SEMI-LUNAR CARTILAGE OF KNEE JOINT. M. S. Henderson. *Minnesota Medicine*, April, 1919.

The author reviews the anatomy of the semi-lunar cartilages and their attachments and gives the mechanical reasons for the greater frequency of derangement of the internal cartilage. Local symptoms are reviewed. X-rays are of negative value. It is a rule that a knee having but one derangement should not be opened. Should derangement recur, operation is advised. The technique of the operation for the removal of the internal cartilage as practised in the orthopedic section of the Mayo clinic is given. Ninety-eight cases operated in the Mayo clinic form the basis of this paper. The internal cartilage was removed in 94 cases, and the external in 4.—*Edward Z. Holt, Atlantic City, N. J.*

XII, 8.

PERTHES' DISEASE. W. W. Watkins. *Southwestern Medicine*, March, 1919.

This article is a review of the literature of the subject. The condition must be differentiated from arthritis deformans and from tuberculosis.

Arthritis deformans affects the joint cartilage and is early associated with crepitation. Osteophytes and hypertrophic bone formation occur. Possibly some flattening may be present. T.B. causes bone rarefaction and destruction.

In Perthes' disease, the cartilage is not affected. Changes occur in the bone beneath, leading to a softening and flattening of the head. The complex symptoms of Legg, Calvé, Perthes and Brandes are given. The most interesting question is that of etiology. Roberts gives four theories as to cause: (1) traumatism, (2) obscure infection, (3) perverted metabolism, (4) syphilis. He believes syphilis is the cause.—*Edward Z. Holt, Atlantic City, N. J.*

XII, 9.

TWO CASES OF INTERMITTENT HYDROPS ARTICULORUM. H. MacClelland, *Lancet*, March 22, 1919.

Brief histories of two cases are given. The knee joint was involved in both. One occurred in a female, aged 23 years, and the other in a male, aged 60. In both cases recurrent swellings of the joint occurred every 10 or 11 days, lasting from 3 to 7 days. These recurrent attacks extended over a period of several months. Patients were perfectly well for intervals of several months. Local or general treatment in either case was of no avail. Exercises seemed to increase the severity of the attack. There was no history of asthma, Raynaud's disease, or angioneurotic edema. No suggestion as to the cause or the treatment of these cases is given.—*Edward Z. Holt, Atlantic City, N. J.*

XVII. SCOLIOSIS.

XVII.

TREATMENT OF SCOLIOSIS. Dr. Joland. *Paris Médical*. January 4, 1919.

Systematic gymnastics are regarded by the author as indispensable in the

treatment of scoliosis, not only in postural curvatures, but even in fixed cases.

It is urged against gymnastics that considering the short time that is given, say one hour each day, that it can do no good, as the cases have all the rest of the day to fall back in the old position.

Joland thinks this is no just argument against the efficacy of gymnastics, because an hour is too long to put weak children to such an ordeal.

He advocates rather to teach these patients a series of exercises, some of which can be followed out at any time during the day; some of which would scarcely be noticed by outsiders; such as the manner of sitting, lying, standing, the kind of bed, etc.

He attaches much more importance to properly regulated exercises than to mechanical supports, and he insists that if the latter are used they should be frequently changed as gain is made upon the deformity.

Laying aside paralytic and congenital defects, he attributes lateral curvature of the spine to muscular fatigue induced by careless and faulty bearing.

To impress upon his readers the beneficial effects of muscular exercises he relates the case of a young girl who was taught to keep her spine erect despite the fact that she was afflicted with a cuneiform deformity of the fourth lumbar vertebra.

Regularly conducted muscular exercises, persevered in for a long time, in conjunction with Wolf's law, both commenced early, will cure the vast majority of scoliosis cases.

In insisting that muscular exercise is the sheet anchor in these cases, he reasons that since it is admitted that scoliosis has a functional origin it is necessary to throw that function in the opposite direction by throwing the spine to the opposite side by frequent and persistent exercise of the opposing muscles.

He claims that the rapidity of improvement is sometimes surprising and relapses are rare.

When relapses do occur it is generally when the system is below par from illness or other causes.

He insists that treatment should be persisted in for a long time and the patient watched for several years.

In conclusion he says that the treatment of scoliosis by gymnastics restores the normal equilibrium of the spine and corrects the form by an improved function. It overcomes the cause of the asymmetry and works successfully against the cause of the deformity. It equalizes the muscular force and resistance.—*Daniel LaFerté, Detroit.*

XIX. TRAUMATIC CONDITIONS.

XIX, 1.

POST-TRAUMATIC SPONDYLITIS. Cluzet. *Paris Médical*, February 1, 1919, p. 92.

Several cases are reported by the author in which injuries of the spine by shell or other trauma have been followed by more or less serious disability. The complicating lesions are usually osteophytic in nature and may be confined to the immediate vicinity of the original injury or distantly removed from it.

One case showed a localized callus bridging from the second to third lumbar vertebra five months after a shell wound of the left lumbar region.

The limited motion of the spine was improved somewhat by physiotherapy but tenderness on lateral bending persisted. Two cases showed rarefaction of vertebral bodies one or two segments removed from the seat of fracture, with pain and limitation of motion, simulating spondylitis. Pain was relieved somewhat by physiotherapy but the flexibility was not improved. In other cases lesions developed quite distant from the fracture. Three of these are reported in detail. One of them showed an exostosis on the third lumbar following a shrapnel wound of the right side of the sacrum, and in another a spondylitis of the first three lumbars progressing to complete ossification occurred after a shell wound between the last dorsal and first lumbar. Thus the complicating disabilities are in some cases worse than the original trauma.

The radiographic images are different from those of the traumatic spondylitis described by Kummel-Verneuil in that there is no kyphosis and the exostoses instead of being confined to the concave side of a kyphos may be found some distance from the seat of injury.

Whatever may be the nature of the trouble it is interesting that the lesions are late developments from definite traumata, occurring at a distance from the original injury. Physiotherapy has been useful in relieving the pain and improving motion. Radiotherapy is also indicated in cases in which pain occurs coincident with development of exostoses.

The author, while not offering any definite conclusions, gives an interesting account of a condition which many have no doubt observed after gun shot or shell wounds of the spine.—*William Arthur Clark, Chicago.*

XIX, 2.

UNUNITED FRACTURE OF THE PATELLA AND OF THE OLECRANON. Fred H. Albee. *Surg., Gyn., and Obstet.*, April, 1919.

The author discusses the treatment of old, ununited fractures of the patella and olecranon. He advises against the bone inlay for a recent fracture and the use of silver wire in all fractures of this nature.

Technique: As in all bone-graft operations on the extremities, a tournaquet is applied to the upper portion of the thigh. The fracture fragments are approached by a U-shaped flap, the apex of whose convexity lies over the ligamentum patellae, its base over the femoral condyles. All fibrous tissue between the fragments is carefully removed; in the case of refractures or fibrous union, the fragment ends are freshened. The fragments are approximated, and the lateral rents in the fibrous capsule are repaired at the sides with interrupted sutures of medium kangaroo tendon. The central portion of the anterior surface of the patella is then denuded of its periosteum and peri-osseous tissues by turning back laterally flaps of these structures on each fragment.

The letter H graft is mortised into the fragments of the patella and held in position by kangaroo tendon sutures.

In fresh fractures of the olecranon, exposure by incision, drilling the fragments, and the insertion of kangaroo tendon for their fixation is believed to be the best method of treatment. In ununited fractures of this process, the inlay graft, held in place by kangaroo tendon, can be easily applied on account of the superficial location of the olecranon, and promises better results than are offered by any other procedure. The graft is inlaid to the tip of the olecranon, on the one hand, and as far into the shaft on the other

as the amount of bone sclerosis indicates. A sliding graft, or one obtained from the tibia, may be used, as conditions indicate; or a peg graft may be used instead of the inlay.—*Leo C. Donnelly, Detroit.*

XIX, 2, *c*.

RECOGNITION AND SIGNIFICANCE OF FRACTURES OF THE PATELLAR BORDER. Capt. R. W. A. Salmond. *British Journal of Surgery.* January, 1919.

An interesting paper which illustrates the value of well taken radiographs in the proper diagnosis and treatment of obscure lesions about the knee joints, eight cases of fissure fracture of the patella coming for x-ray examination with a tentative diagnosis of synovitis, arthritis, et cetera.

The chief points in this condition are:

1. The difficulty of obtaining a definite history of trauma, though on careful interrogation a story of some slight indirect injury may be elicited.
2. It may be right-sided, or left-sided, or both, according to the exciting cause.
3. The seat of any discomfort or pain is usually on the inner side of the patella, while the fissure fractures observed have been without exception on the outer border.
4. The direction of the line of fracture is either longitudinal, or obliquely downwards and outwards, but not transverse as in the usual muscular fracture.
5. A linear depression may be felt, corresponding to the line of fissure; pressure of the bone on either side of this may elicit separate movement, and generally tenderness, but not crepitus.
6. Synovitis is frequently present, or has been at some previous date, caused partly by the tearing of the synovial membrane with the fissuring of the posterior surface of the patella, and it is prone to recur.—*H. W. Meyerding, Rochester, Minn.*

XIX, 2, *c*.

REDUCTION OF SUB-TROCHANTERIC FRACTURES BY VENTRAL POSITION. Constantini and Vigot. *Paris Médical,* December 14, 1918, p. 486.

In order to establish and maintain the required position of flexion-abduction of the thigh in cases of sub-trochanteric and high shaft fractures of the femur, the authors have treated three cases by placing the patient in ventral position on a table and allowing the affected leg to hang down by its own weight. The table used has a top made up of small detachable sections. Such of these sections are removed as will permit the fractured leg to hang through, and the good leg to remain flat on the same level with the patient's body. The leg is suspended from the table by means of a strap around the ankle, thus causing a moderate flexion of the knee. The weight of the member helps considerably in effecting the reduction of the fracture. In the cases described, perfect apposition was secured, the compound fractures enabling the operator to actually see the alignment. The position thus secured was maintained by application of a plaster cast. On evacuation of these patients a short time after, the fragments were still in good apposition. In short, "we have obtained very easily, the reduction of a fracture reputed difficult to reduce by utilization of the simple weight of the member."—*William Arthur Clark, Chicago.*